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PRIZE ESSAY,

BY

JOHN WRIGHT, V.M.H., F.R.H.S.



TENTH EDITION (Revised).

LONDON:

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FOR

THE WORSHIPFUL COMPANY OF FRUITERERS.

PROFITABLE FRUIT-GROWING

FOR
COTTAGERS AND SMALL HOLDERS OF LAND.
GOLD MEDAL ESSAY.

BY

JOHN WRIGHT, V.M.H., F.R.H.S.,

EDITOR (LATE) OF THE "JOURNAL OF HORTICULTURE," "THE FRUIT GROWERS' GUIDE,"
"THE FLOWER GROWERS' GUIDE," "PRIMER ON GREENHOUSE AND WINDOW PLANTS,"
"PRIMER ON VEGETABLES," "CHEMISTRY OF THE GARDEN"; AUTHOR OF
"MUSHROOMS FOR THE MILLION," "PRIMER ON HORTICULTURE,"
"PRIMER ON GARDEN FLOWERS AND PLANTS," AND "ALLOT-
MENTS—THEIR ADVANTAGES AND UTILISATION."

MANY YEARS MEMBER OF THE FRUIT COMMITTEE OF THE ROYAL HORTICULTURAL SOCIETY;
AND CHIEF INSTRUCTOR ON HORTICULTURE TO THE SURREY COUNTY COUNCIL.

WRITTEN FOR

THE WORSHIPFUL COMPANY OF FRUITERERS,

*And Dedicated by the Company to the Right Honourable SIR JAMES WHITEHEAD, Bart.,
Lord Mayor of London, 1890.*



LONDON :

W. H. & L. COLLINGRIDGE, 148 & 149, ALDERSGATE STREET, E.C. 1.

1917.

TENTH EDITION, REVISED AND ENLARGED.]

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OPINIONS OF THE PRESS ON THE FIRST EDITION.

"It was a bright idea of the Fruiterers' Company to expend a small sum for a Prize Essay on Fruit Culture for Cottagers. Mr. Wright's book should be universally read and extensively acted on."—*Gardeners' Magazine*.

"This is the essay which was premiated by the Fruiterers' Company, and its sensible practical character justifies the award."—*Gardeners' Chronicle*.

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"The instructions are as plainly displayed and as easily understood as the alphabet."—*Cardiff Weekly Mail*.

"The Fruiterers' Company's prize essay is at once a stimulus to better fruit cultivation, and a practical guide to the means whereby this may be secured."—*Reading Mercury*.

"The Worshipful Company of Fruiterers deserve the warmest thanks for publishing in book form Mr. John Wright's admirable prize essay on 'Profitable Fruit Growing.'"—*Gravesend Journal*.

"We heartily commend the volume to the notice of cottagers and allotment holders, also to those gentlemen who are anxious to promote the success of these struggling working-men. A copy or two placed in the village reading-room would be of great value."—*Lincolnshire Chronicle*.

"A most practical work for small gardens, cottage, or allotment owners; invaluable for its sound teaching. Just the work for distribution among cottage garden societies, &c."—GEORGE BUNYARD, *Maidstone* (in "Fruit Growing for Profit.")

ON
PROFITABLE FRUIT GROWING
FOR
COTTAGERS & OTHERS WITH SMALL HOLDINGS.
As Published in 1889.

1. A prize of twenty-five guineas, together with a Gold Medal, will be offered by the Worshipful Company of Fruiterers for the best Essay on the above subject, and which shall not exceed 20,000 words.

2. The object is to encourage fruit culture by cottagers and others with small holdings, as a substitute for, or adjunct to, the ordinary methods of cropping their gardens and allotments with roots or other vegetables.

3. The Essay must convey plain details on the selection of the most suitable varieties of fruits, and the planting, pruning, and other essential operations in the management of fruit trees and fruit bearing bushes, also on gathering, storing, and disposing of the crops.

4. The conditions are: (a) No person shall be eligible to compete who has not had at the least ten years' actual experience in the cultivation of fruit, and a declaration to that effect will be required from each competitor, setting forth in what part of the country and in what locality this experience has been obtained; (b) The *nom de plume* or motto of each competitor is to be plainly written on the top of his MS., and his name and address with motto are to be sent under seal in a separate envelope. The envelope containing the Essay is to be marked on the top left-hand corner with the words, "Fruit Essay." Any departure from either of these conditions will disqualify for competition.

5. The envelopes containing the names of the competitors will not be opened until after the prize has been awarded, and Essays (except the successful one), will be returned to those writers of them who send stamped directed envelopes for that purpose within one month from the date on which the result appears in the gardening papers.

6. The Essays are to be addressed to the Clerk of the Worshipful Company of Fruiterers (O. C. T. Eagleton, Esq.), 40, Chancery Lane, W.C., not later than July 31st, 1889.

Sixty persons applied for and obtained the printed conditions, but only the number stated below sent in essays. The gentlemen appointed to examine them were Messrs. T. Francis Rivers, fruit nurseryman, Sawbridgeworth; A. F. Barron, Superintendent, Royal Horticultural Society's Gardens, Chiswick; and Shirley Hibberd, editor of the *Gardeners' Magazine*.

THE ADJUDICATORS' AWARD.

"Having carefully examined the fourteen essays submitted, we have unanimously selected that signed 'BRITISH WORKMAN' for the award of the prize. This essay combines practical knowledge with literary ability, and complies with the conditions of the competition. A considerable proportion of the fourteen essays deserve commendation, and it is a matter of regret to us that we have only one prize at our command, where perhaps three or four might be worthily awarded. We would mention those signed 'Pomona,' 'Progression,' 'Jabez Chawley,' and 'Hope On,' as particularly meritorious, although not meeting with our entire approval in connection with the present reference.

"T. FRANCIS RIVERS,
"A. F. BARRON,
"SHIRLEY HIBBERD."

The prizes were presented to the successful competitor at the Mansion House, by the Lord Mayor, on September 25th, 1889, the Medal bearing the following inscription:—"Presented by ROBERT HOGG, LL.D., F.L.S., to Mr. JOHN WRIGHT, the successful competitor for the prize of 25 Guineas, offered by H. R. WILLIAMS, Esq., Past-Master, through the Worshipful Company of Fruiterers, for an Essay on the Profitable Culture of Fruit by Cottagers, 1889."

EDITOR'S NOTE TO THE TENTH EDITION.

On the eve of the preparation of a Tenth Edition of this Essay, the Author passed away, full of years and honours. His interest in it, and in Fruit-growing and Horticulture generally, was undiminished to the last. From childhood to ripe old age (he was within a few days of his eightieth birthday when he died) his heart was in Gardening. The graceful act of the Fruiterers' Company in asking me to prepare the Tenth Edition is deeply appreciated, not only by myself, but by every member of our family. The task of revision has proved, however, to be an easy one, for the Author had benefited by the advice of numerous friends, equally as practical as himself, in revising previous Editions, and consequently but slight alteration and addition have been necessary. The object of providing a Handbook to which persons who have little or no knowledge may turn for simple and easily comprehended instruction, has been kept in view.

WALTER P. WRIGHT.

May, 1917.

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AUTHOR'S NOTE TO THE NINTH EDITION.

SUMMER PINCHING AND PRUNING.

WHILST numbers of letters have been received in approval of the general routine advised in previous editions of this work, a few have come to hand seeking for further information on the above twin subject.

“Pinching” means nipping off the points of side shoots on young branches with the finger and thumb, as soon as three pairs of leaves form—not counting small incipient basal leaves—then, if other growths follow, nipping them off above the first leaf before it unfolds. The object is to produce good working leaves exposed to the sun for the formation of blossom buds, also to prevent congestion by a mass of over-crowded useless leaves which are fatal to fruitfulness.

“Pruning” means the removal of woody portions of trees, as required, with the knife or other instrument either in summer or winter. The point to remember is that the sun should shine between the branches when in full leaf for ensuring productiveness, under the influence of favourable weather with freedom from insects, caterpillars and fungoid enemies. References to these can be found in the Index, and it is a golden rule to apply them in good time, not forgetting that prevention is both cheaper and better than destruction.

The chapter opening on page 110 should be closely studied by new readers till they obtain a mastery of the principles therein embodied. Young Apple, Pear or Plum trees received from nurseries may each have three to as many more long and strong stems. As the roots for producing these must to the extent of at least two-thirds be left behind, the balance between roots and branches is, obviously, destroyed. The only way of restoring it is by shortening the branches, reducing their length by half or more. The result of this will be as shown in the young Gooseberry plant on page 36 and the Apple tree on page 59. The number of branches is doubled, and if care be taken that the end buds left after pruning point outwards, that will be the right way for “opening” the bush or tree; but if they point inwards the subsequent growths will be the beginning of congestion, which ought to be prevented.

The result of pinching young growths is the very best leafage produced under the direct action of light, and blossom buds form at the base of some or most of them, to which the then “spurs” can be pruned in the winter. This artificial production of blossom buds is an interesting occupation for many amateurs who have time for, and derive pleasure in, attending to the trees in their gardens. If, as occasionally happens, that frost destroys the blossoms and no fruit forms to arrest exuberant growth, it may be desirable to cut through the roots with a sharp spade to prevent the over-abundant supply of moisture to the trees (see page 64).

The details given are for amateurs who have sought for information of the kind now described. Extensive growers of fruit as a profitable occupation cannot carry out the above details, but they can allow the main branches of their trees to widen out to two or three feet asunder and so permit the sun to shine between them and on the leaves, which, when clean, green and sound in texture, play, under the influence of the sun, such an important part in the production of blossom and the development of fruit.

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INTRODUCTION.

AT no former period was such a widespread desire manifested as now exists in this country for improving the condition of the industrial population, and for developing the resources of the soil in the production of an adequate supply of hardy fruit.

The necessity for the accomplishment of these objects is apparent ; for on the one hand we have men in abundance who, with the aid of sound guidance, could engage usefully in the work, and on the other the extraordinary fact of not cities and towns only, but even country villages, with fruit-growing land all around them, largely supplied with Apples grown on the western shores of the Atlantic. It is true we have orchards, but of what kind ? In the majority of instances they are composed of trees planted generations, not to say centuries, ago, which can only bear fruit so small, juiceless, and uninviting, that consumers naturally purchase the larger and better-looking imported samples which are so plentiful and so moderate in price.

If home-cultivators have not had a larger share of profit in producing the fruit-supply in the markets, where rests the fault ? A number of answers, in the form of allegations, are ready to hand, and have been so often repeated as to have become common property. Here they are : Obstructive land laws ; ecclesiastical charges ; oppressive railway rates ; high market tolls ; salesmen's

exactions ; shop-keepers' extortions ; free trade, and bad climate. Repeatedly have these reasons been given in all sincerity, as the causes of the great importations of hardy fruit.

We can admit the full force of all these impediments, but it will not be difficult to show that something remains more accountable than them all for the above-mentioned anomaly. What is the great omission ?

Mark well the answer. There is not one obstacle, but three : namely, a lack of knowledge on the subject of fruit, of enterprise in producing it in its best form, and of art in placing it before the public in the most attractive manner for arresting attention and commanding purchasers.

Granting to Transatlantic cultivators all their natural advantages, which are possibly over-estimated, still let us not forget our own apathy, our loose methods, and our unsystematic, unbusiness-like procedure—not forget, but abandon them. Acting on sounder principles and more intelligent lines, the time will come when we shall to a far greater extent than now, and far more creditably, share in providing our population with the most wholesome of food, which will be increasingly required—FRUIT—the outcome of home effort and well-applied labour in the gardens and orchards of the United Kingdom.

Let trees and bushes be planted, of varieties of proved merit, in soils and situations in which they will thrive, and they will be growing into fruitfulness contemporaneously with the removal of legal and commercial impediments ; thus those who take action the soonest will be the first to profit by whatever changes may be made. Even under existing conditions, fruit culture, well conducted, has been of real service to many, and while land under ordinary crops has depreciated in value during late years, that on which young orchards of thrifty trees are established has increased in price. What better testimony can be needed of the improving character of fruit culture ? And what more conclusive evidence is required for its extension than the predominance of

cankered trees and worn-out orchards nearly all over the country, with fruitless homesteads and treeless gardens on every hand? Let us see what can be done for those who are willing to help themselves in increasing the supply of useful, wholesome, hardy fruit.

METHODS OF PROCEDURE AND EXAMPLES TO BE FOLLOWED.

First, the principle has to be determined whether fruit shall be grown as a substitute for, or as an adjunct to, other crops. With very few exceptions the latter is strongly recommended. Unless a small holder of land is sufficiently near a town to drive in on market-days, with poultry, eggs, and butter, or other useful products of his little farm or garden, he may not find the cultivation of fruit so profitable as he anticipates. The grower of a few hundredweights is so handicapped in respect to freightage that he cannot compete with the large fruit farmers in supplying distant markets; and whether railway companies reduce their rates for small consignments or not, with the view of developing trade, it is probable that the advantage will still rest with large consigners.

In recognised fruit-growing districts small plots may be devoted wholly to fruit culture, as regular channels exist for the disposal of the produce. Beyond those districts the safest method will be for cottagers, allotment holders, and small farmers to grow fruit as an adjunct to, instead of a substitute for, other crops. They ought to provide an abundant supply for their families, and also endeavour to meet the demands of adjacent towns. To show the practical working of the system advocated, and the advantages of fruit culture, a few examples may be adduced, as no teaching is so cogent as that founded on accomplished facts.

A Farmer's Example.—Thirty years ago a friend of the writer entered on a small farm, on which grew, near the home-

stead, a dozen Apple trees. The fruit being found profitable, he enclosed and planted about an acre of the adjoining land with the best Apples and Plums, also a few Pears, as well as Strawberries and bush fruits. The ground was kept clean like a garden, by hoeing in summer, and the roots of the trees were not injured by spade-digging in winter. His wife looked after the minor products of the farm, and all not required at home were regularly taken to market. Thrift, industry, and good management, enabled more and more land to be taken, until the "small holding" has become one of upwards of a thousand acres. With every increase of land the occupant planted some fruit trees, and the dairy, poultry, and garden produce had the same attention as heretofore. Now mark the result. From the beginning until now, what are termed the "minor products" of the land and homestead have continued to defray domestic expenses, and these for the last ten years cannot have been less than £200 per annum. To this gratifying result, garden and orchard produce has contributed materially; indeed, without it the noteworthy achievement could not be recorded. This once small holder is now (1899), a County Councillor, and his last planted orchard of two or three acres is adding to his income from fruit.

A Widow's Example.—An example on a small scale may be cited next, which shows with great force the advantages of fruit culture in a cottage garden, thirty yards long by twenty yards wide, or practically an eighth of an acre in extent. This garden belonged to a working builder, who was an industrious, prudent, saving man. On his death his widow was left with an annuity of £15 a year, and with the proceeds of this small garden she was able to continue in her dwelling; she lived in homely comfort for twenty years, and, in fact, saved a few pounds, which could not have been done without making on the average £10 from the garden yearly. This, with at least £1 a year from the honey, increased the widow's "old age pension" to over 7s. a week (after paying the rent of £5).

A plan (Fig. 1) showing the arrangement and planting of this useful garden may be instructive. It shows that the garden is divided lengthways by a path (A) three feet wide to admit a

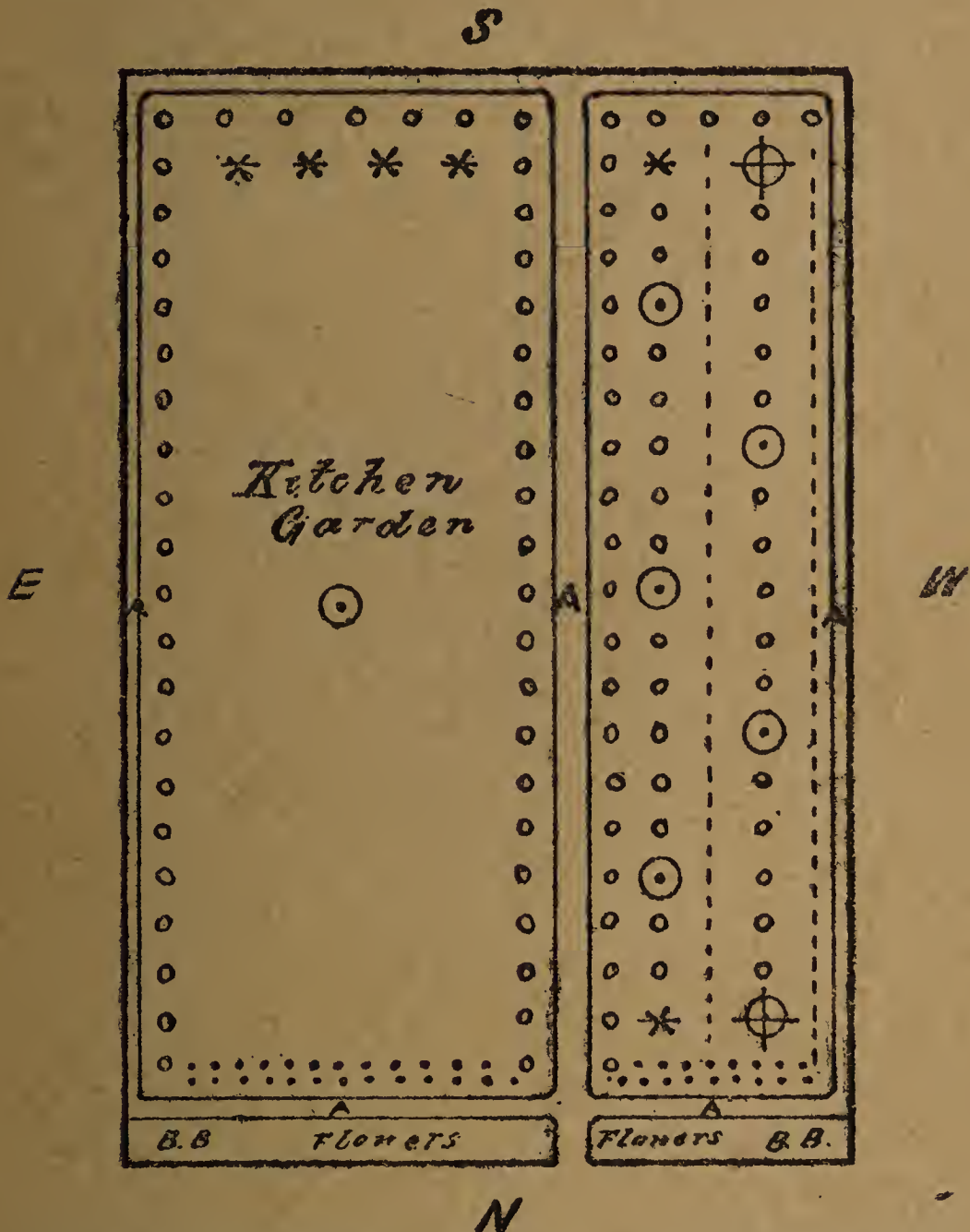


Fig 1.—PLAN OF COTTAGER'S FRUIT AND VEGETABLE GARDEN.

(Scale, 1 inch = 24 feet).

- A Foot-paths. B B Beehives. ⊙ Apple Trees (6). ⊕ Pear Trees (2).
 * Plum Trees (6). - - - Raspberry Canes.
 o Currant and Gooseberry Bushes. . . . Strawberries.

small wheel-barrow. It also has paths at the ends two feet wide, and along the sides eighteen inches wide, or just sufficient for gathering the Raspberries on the west side, and Gooseberries on the

east side. The larger part of the garden, 36 feet wide, was chiefly devoted to vegetables; the smaller part, 21 feet wide, being devoted wholly to fruit culture.

The references show the number and kinds of trees grown, namely, six Apples, two Pears, and six Plums, as orchard standards; two continuous lines of Raspberries, planted as will be described, and a hundred Gooseberry and Currant bushes. A few Strawberries were grown across the north end of the garden near the bee-hives and flowers, the enclosure being entered there from the cottage. This was, however, sufficiently distant from the hives to prevent inconvenience arising from the bees. Strawberries were originally planted all round next the paths, and afforded good crops while the fruit bushes were small. On such a limited scale the planting appears crowded in the plan, but it was not really so. The arrangement answered well, as it will do again if carried out with good varieties in fertile soil. The Apple and Pear trees are 24 feet apart in line, 15 feet diagonally; the Plums, 7 feet to 8 feet, forming a tall hedge; small bushes 4 feet asunder, and half that from the path-sides—all workable distances in narrow strips of ground.

What may be regarded as a fair average return from the above number of trees and bushes when in a full bearing state? Taking one year with another, it will be conceded the following is a moderate computation for trees and bushes in full bearing :

	£	s.	d.
6 Apple and 2 Pear trees, at 7s. each	2	16	0
6 Plums, at 3s. each	0	18	0
100 Gooseberry and Currant bushes at 1s. each	5	0	0
160 feet line of Raspberries at 2d. per foot	1	6	8
	£10	0	8

During some years the crop of one or other of the kinds failed, a natural incident of fruit culture, but it is certain the amount named was the annual average realized during a period of twenty

years. That is a lesson from life of the value of fruit well managed in a cottager's garden.

A Labourer's Example.—Although the above demonstrates the value of fruit in the gardens of cottagers, another case may be adduced in confirmation. A labouring man, who worked for several years in a garden with the writer, had an enclosure attached to his cottage. His wages averaged from twelve to fifteen shillings per week. He was an active worker, and strove hard to save a little money by rearing pigs, keeping a cow, and making the most of his garden. This was rather more than an eighth of an acre in extent. It contained eight or nine Apple trees, some of which he grafted with improved varieties, and grew under and between them as many Gooseberries, Currants, and Raspberries as he could, also marginal rows of Strawberries. Two-thirds of the ground was thus occupied, and the remainder devoted to early Potatoes and other vegetables; a field allotment of a rood afforded him a supply of late Potatoes and other roots for winter use. He died at the age of fifty, but left his widow in a position to open a small shop, and by carrying on the work he initiated in the garden, and other ways mentioned, she not only brought up her family, but also orphan grandchildren, without calling on the parish for a penny. This shows what can be accomplished by persevering effort and wisely making provision for the future in planting fruit trees and bushes.

A Tradesman's Example.—Fruit-trees enhance the value of property, and homesteads on which they are established let better in consequence. An instance can be given. A tradesman purchased some village property and erected small cottages. In each plot of ground attached he planted 10s. worth of fruit trees and bushes, with the result of readily letting the dwellings at a rental of £4 10s., though it was originally intended to charge only four guineas for them. As the trees came into bearing and the tenants left, the rents were increased to £5. It is not suggested that everyone who planted similarly everywhere would

reap the same advantage, but the fact remains that the rent of land occupied with thrifty fruit-trees has been rising during the past few years, while much land that is without such trees has been falling in value. When cottages fall vacant, and the gardens are stocked with good fruit trees and bushes, applicants for the dwellings are invariably numerous in all fairly populated villages, thus showing their appreciation of the usefulness of fruit.

An Allotment-Holder's Example.—During the preparation of this essay (in 1899) the following letter was received from Mr. William Jacob, of Petworth :—

“ Nothing is more refreshing to me than gardening and fruit-growing, in which I have been interested from quite a boy, and I have now had sixty years' experience. I never yet met with a man whose theory upon any subject was equal to practical experience. The field of allotments, of which my garden forms a part, has at present fifteen tenants. It was formerly worked by the landlord as a cornfield. He did not make it pay, so made it into gardens, about forty rods each, and I should think the value of the produce from the land in fruit and vegetables is upwards of £400 a year; and the owner realizes a handsome rental of nearly £35 per annum. I give £5 5s. for only seventy-five rods, but it is in the best position, and worth more than the rest.”

Here was once a four-acre cornfield that did not pay, now yielding a rental of between £8 and £9 an acre, and one of the tenants paying at the rate of more than £11 an acre. Yet he has not a word of complaint, but on the contrary is well satisfied with the profit he derives from his culture. The essayist has inspected the plot, which is almost entirely occupied with fruit-trees, enclosed with a hedge of Raspberries, which one year gave a yield of upwards of two quarts of fruit to the lineal yard. This fruit-plot is remarkable for its productiveness—the result of high cultivation and well-chosen varieties.

A Landlord's Example.—Passing from cottagers to small

farmers, landlords may find it to their advantage to plant a few fruit-trees for striving tenants, also for securing good tenants as holdings become vacant. Again an example will be illustrative. A gentleman of property, who understands fruit culture, has planted an acre of land next the homestead of one of his tenants, with Apples, Plums, and bush fruit, the extent of the holding being about thirty acres. The trees are all standards, the Apples eight yards apart, in rows about ten yards asunder, the Plums



Fig. 2.—APPLE, LORD GROSVENOR, IN A RIDGMONT FRUIT GARDEN.
(See page 16).

closer in the rows. In the lines with the trees, not in the spaces between the rows, Currants and Gooseberries are planted five feet asunder. The space between the rows is wide, for the purpose of being worked with the plough, and cropped with roots or whatever

the farmer prefers, or he can grow Strawberries or more bush fruits if he chooses to raise or procure them. He can, in a word, either make the whole into a fruit garden and keep it as such, or grow vegetables for market, or roots for stock, so long as there is space between the trees. Whatever method may be adopted will be advantageous to the tenant, and the trees, being all good varieties, will enhance the value of the land. The owner having purchased the trees, planted them carefully, and staked securely, will also prune them until they form good heads. Afterwards the tenant can easily manage them, and he can have no pretence to a claim for compensation when he leaves, no matter how valuable the trees may be. The plan is an excellent one, worthy of more general adoption. It is perfectly just as between landlord and tenant, and may be of service to both.

A Society's Example.—Provincial Horticultural Societies may usefully aid in the work which it is the object of the writer to promote. He has long been aware of the admirable practice of the Grantham Horticultural Society, in distributing fruit trees and bushes among the cottagers and artizans of the district; and the following record of the work, obligingly supplied by the Honorary Secretary, Mr. William Olive Yeatman, proves how satisfactory it has been. "We commenced," writes Mr. Yeatman, "giving fruit trees in 1874, and vegetable seeds in 1878, and continued these gifts until 1885, when we had pretty well stocked the villages around Grantham. We distributed 1,672 fruit trees—the best sorts of Apples, Plums, Pears, and Apricots; 2,006 fruit bushes; 458 collections of vegetable seeds and Potatoes. The result has been that not only have those persons who received these gifts made their gardens profitable to themselves, but that we now have a first-rate fruit and vegetable market at Grantham. Another result has been that numbers of persons who were not recipients, seeing their neighbour's gardens so much improved, have followed their example. We sent forms to the clergyman,

squire, or a farmer in each village, to be filled in with the names and addresses of persons most worthy of encouragement, and the number and kinds of trees most suitable for their gardens."

Honourable mention is due to the Society in question for having initiated the good work and carried it out so well. Cannot other societies follow the excellent example?

PADDOCK AND HEDGEROW TREES.

Isolated trees are often wanted for purposes of shade in paddocks, and instead of these being hawthorns, elms, sycamores, and others, why cannot they be Plums and Damsons, Apples and Pears? Where wild trees grow well, fruit-trees will thrive if carefully planted and protected from stock, by which many are ruined. They will also grow in hedgerows where the land is of good staple, the same as Damsons are grown in Kent, and Apples in Nottinghamshire and Worcestershire. Many a holder of from five to twenty acres of land might grow orchard fruit enough for his family in that way, and have some to spare, without occupying the land he has under ordinary cultivation.

When trees are isolated, or in hedgerows, they must be strong in constitution, as they are more exposed to storms than in orchards. The Prune Damson, Czar Plum, Hessle Pear, and Bramley's Seedling Apple, are good. The full value of this Apple for standards (on the wild Crab stock) and exposed positions is not generally known. A farmer's orchard of one and a half acre last year (1888), a notoriously bad Apple year, yielded fruit on fifteen-year-old trees that sold for £70, the purchaser gathering the crop, and the farmer has scores of trees coming into bearing round his fields.

Large stations are important for planting in the positions indi-

cated. The soil should be broken up to a depth of two feet, and a diameter of six feet, removing a few barrowfuls of the subsoil, if inferior, and adding better, taken from the surface elsewhere, preferably of a turfy nature. Grass should not grow within three feet of the stems for a few years, and weeds ought to be prevented by running the hoe through the ground frequently. This also prevents surface cracking, thus conserving the moisture and promoting growth.

Short manure spread on the soil in the autumn, and there left to decay, will do much good, and a supplementary dressing, early in June, acts very beneficially, especially in dry seasons and districts. The trees must be securely staked, taking particular

care that the ligatures are kept from injuring the bark, by placing a few soft willow twigs between the stem and the stake. These prevent abrasion, while admitting air, thus the stem is not made tender, and liable to be affected by canker.

It is also absolutely necessary to prevent the stems being nibbled by rabbits or sheep, but gas tar must not be applied to the bark for that purpose. A few stakes driven down, straight straw bound round them, and this smeared with tar occasionally, will render them safe. So will furze, briers, dry plasterers' laths, or small-meshed hexagon wire netting if tied loosely, yet safely round them. Trees in open paddocks should have stems not less than six,



Fig. 3.—PROTECTING Paddock TREES.

preferably seven, feet high, and must be well fenced against cattle. This ought always to be done at the time of planting. The illustration (Fig 3), affords an example, but three posts of larch or oak firmly planted triangularly, with their tops slanting outwards, and a few battens nailed across from post to post, will answer the purpose. If the posts are well charred before insertion, especially those parts six inches below, and the same distance above ground, they will last as long as protection is needed; they invariably decay near the surface of the ground, under the combined action of air and moisture.

FRUIT GARDENS.

Some small holders of land may desire, not an orchard of standard trees merely, but a regular Apple and Plum garden, the majority of the Apples being grown as bushes on a dwarfing stock for early bearing; with longer lived standards at suitable intervals for coming into profit when the more precocious dwarfs fail, and remaining productive for perhaps two or three generations. With judiciously chosen varieties, planted in deeply worked, well-tilled soil of good staple, a quicker return on outlay is attainable by this method than by any other, but the trees must have attention. Obviously a far greater number is required for planting a given area of ground than for ordinary orchards; but these dwarf trees, purchased as "maidens," or one year's growth after grafting or budding, are the cheapest of all, and nurserymen sell them at reduced rates by the hundred; yet "two-year-olds" are worth their extra cost, and are excellent trees to plant. Older trees can be had, set with fruit buds, at enhanced prices, but usually the younger trees overtake them in a very few years. When trees bear prodigiously in a year or two after planting, and astonish inexperienced observers, who forthwith go into ecstasies over the profits of fruit growing, it may be taken for granted that they will not "wear"; they are enfeebled in

infancy, and their true character may be fairly expressed in the familiar sentence applied to abused humanity—"A short life, but a merry one." Let these precocious prodigies on weak stocks be avoided by all who desire to see their trees increase in profit with increasing years.



Fig. 4.—BUSH APPLE TREE.

An illustration of a good bush Apple tree on the English broad-leaved paradise stock is given (Fig. 4), also an example of pruning, and the bearing resulting therefrom, shown ; details will be given in subsequent pages.

With the object of aiding persons who desire to have a genuine fruit-garden of the nature suggested, a plan may be given (Fig.

5,) which shows at a glance the method of arrangement. It is drawn to the same scale as the plan on page 5, in which small bush fruits have prominence ; but in this eighth of an acre they are not shown. It is designed as a section of a field, and is

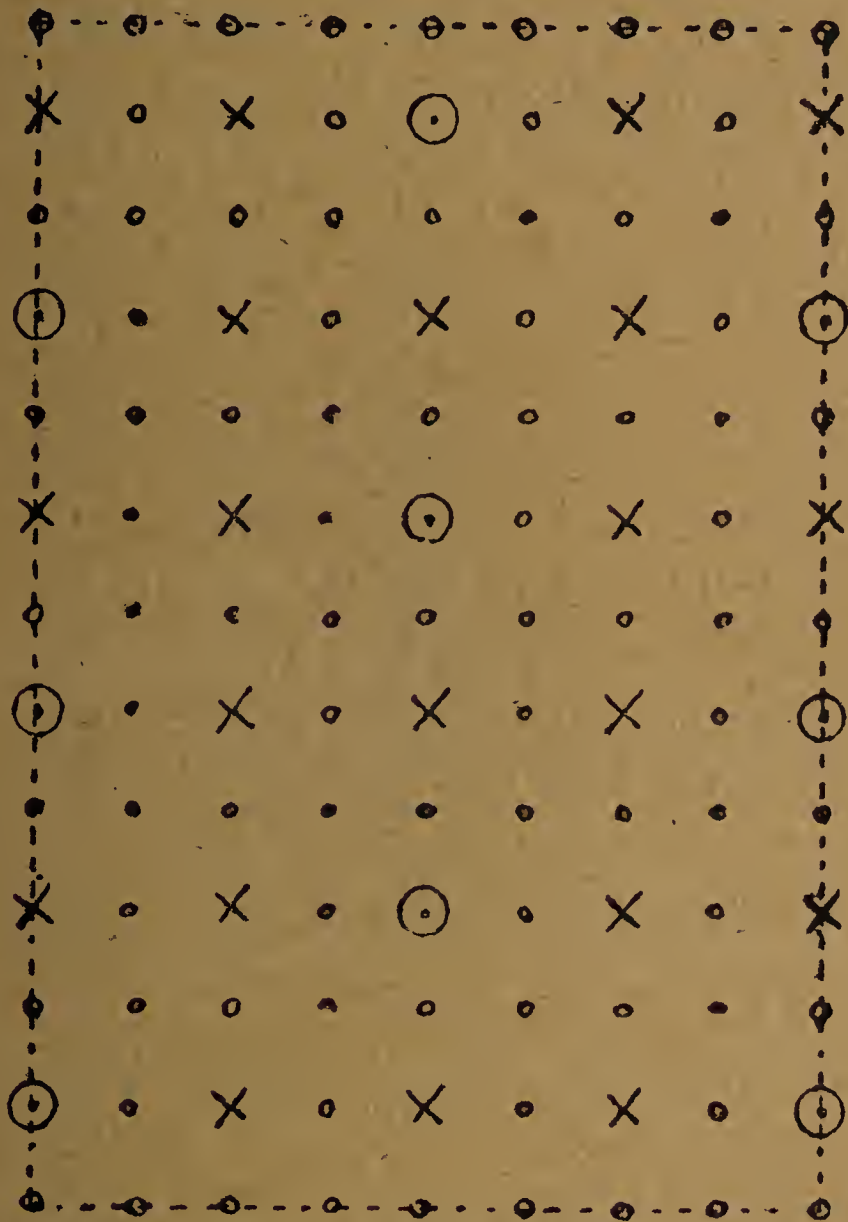


Fig. 5.—FRUIT GARDEN.

(Scale, 1 inch = 24 feet.)

○ Standard Apples. o Dwarf Apples. × Plums.

capable of extension by the addition of any desired number of rows in any direction. It should be remembered, however, that whether the plantation be large or small, the boundary fence must not be less than 12 feet from the outer rows of trees.

The large orchard standards are 30 feet, the Plums 15 feet, and the dwarf or bush Apples $7\frac{1}{2}$ feet apart. Strawberries or other low-growing crops can be grown between the rows for a time. If it is desired, three Gooseberry or Currant bushes can be grown in the spaces in line with the trees, instead of one dwarf Apple, as shown in the plan. Such a garden well managed will yield fruit quickly, and continue profitable for half a century. The illustration on page 9 is representative of a cultivated fruit garden at Ridgmont. The tree in the foreground is a fruiting standard of Lord Grosvenor Apple—a good early variety, which intending planters of fruit should include in their selections.

LARGE AND SMALL FRUITS.

For practical purposes the term “large” applies to those fruits that are borne by trees which in a natural state assume large dimensions, such as Apples, Pears, Plums, and others, even though Apples and Pears are dwarfed artificially by establishing trees on certain stocks that restrain their growth. The term “small” has reference to naturally low-growing bush or berry fruits. Fruits borne on tall and standard trees yield, in commercial parlance, “top” crops; those on bushes between and beneath them “bottom” crops. These include Strawberries, which are known as “ground” fruits. Other distinguishing terms are also employed by dealers, such as “hard” fruits, for indicating those of firm texture, and not commonly used for preserving; and “soft” fruits, or those including Plums, which are so used extensively.

For purposes of cultivation the terms large and small fruit meet all necessary requirements. In giving concise details of management, with selections of varieties, the smaller kinds of fruit shall first have attention, for the following reasons:—

(1) they are the quickest in yielding a return to the planters ; (2) they are within the means of the greatest number of spade workers to grow, as on enclosed allotments and in cottage gardens ; (3) they are serviceable in every household ; (4) they are absent from thousands of village homes in which they might be had for the growing ; (5) the gardenless population will always purchase a surplus if of the best quality ; (6) they are so valuable as bottom crops in mixed fruit plantations ; and (7) because the information on raising, planting, pruning, and general management will be preparatory to that relating to the larger kinds.

Suitable varieties to plant will be found in the chapters devoted to the different kinds of fruit.

STRAWBERRIES.

The Strawberry may not generally be considered a fruit "for cottagers and small holders of land," but in one important respect it is especially deserving of being so regarded. If equal sized plots of ground were planted at the same time with different kinds of fruit, all grown equally well, and the crops sold, not one could approach the Strawberry in profit during the first five years. It is the dwarfest in growth, the quickest in productiveness, and is easily cultivated by any intelligent worker.

It is within the knowledge of cultivators and residents in localities where Strawberry-growing has been introduced and well conducted, that the value of the land has been raised 100 per cent., or from a rental of 30s. to £3 per acre, and in some instances considerably more. In Scotland hundreds of acres of heath land have been raised from 15s. to upwards of £4 an acre in value by Strawberry culture, to the mutual advantage of all concerned—owners, tenants, and the operative classes.

Near Botley, in Hampshire, about fifteen hundred acres are grown, chiefly by occupying tenants of a quarter of an acre to ten

acres of land. Sixty tons of fruit were sent from Botley Station on June 25th, 1889. Large early fruit sold for 10s. a gallon of 7 lbs.; smaller and later crops falling to eighteen pence. Good crops pay at a shilling. An acre in a good season yields a return of £50; cost of culture, including rent, labour, picking, manure (twenty tons per acre) £17; profit £33. Small plants are sold at five shillings a thousand. That represents open allotment or field culture. The crops, however, ripen earlier than in many other localities, and thus have an advantage in the market. Full crops, in correspondingly late districts, and sold after the season's "glut" is over, are also on that account additionally remunerative. Heavier crops are obtained from richer soil in gardens.

Strawberries usually bear about three full crops, but some should be planted every year for maintaining profitable plantations, removing the older as the plants become exhausted.

Raising Plants.—The first essential to success is the establishment of strong plants ready for planting in good ground by the end of July or the first week in August. This is perfectly practicable. The secret of success is to be found in



Fig. 6. —RAISING STRAWBERRIES.

early runners from fruitful plants and the quick rooting of the plantlets that form on them. For insuring these it is of the first importance to establish a few early young plants yearly in the best soil and position available. These afford runners much

sooner and stronger than can be obtained from old plants partially exhausted by fruiting. The earliest plants are established by pegging the runners into small pots of rich soil, or in newly pared turf (containing no couch), cut into three-inch squares and placed closely together, grass downwards, as shown in Fig. 6. The latter plan is within the means of many cottagers and allotment-holders, who can obtain turf from the road sides. If the small squares are kept moist and planted in good ground, say after the removal of early Potatoes in July, some of the Strawberry plants may, if well supported, bear from half a pound to a pound of fruit the first year. Simpler methods have, however, usually to be resorted to. Stir the earth round the bearing plants and press the plantlets into the soil with pegs or flat stones. With regular moisture, roots quickly form, and plants are ready for removal during the month of August; these, if carefully planted in good ground and duly watered occasionally with soap-suds, will bear fine fruit the following June.

It is necessary to refer to still another plan, not so quick in fruit-production as the foregoing, but which has to be resorted to extensively. Late and small runners are planted five or six inches apart in rows nine inches asunder in the autumn, and remain there till they can be finally planted in March for bearing. They will not produce any substantial crop the same year; indeed, if the plants are weak, it is a gain to pick off the few flower trusses, and the plants will be the stronger for the next season's crop, which ought to be a full one. But though these plants occupy the ground for a season without producing fruit, or only a light crop, the space need not be wholly wasted. It is economical to allow a distance of two-and-a-half feet between rows of Strawberries, even if the plants are arranged closer in them, or eighteen inches from each other, as then recourse can be had to inter-cropping. For occupying the space between the rows the first season, Onions are particularly suitable, because the tops do not spread while the bulbs are highly serviceable. Two or three

rows may be grown in each strip, either by sowing seeds in March or transplanting from beds sown in August.

Methods of Planting.—Since there are three wrong ways to one that is right, and as the latter would be the least likely to be adopted by the inexperienced, it will be useful to show them all, as it is quite as instructive to make clear

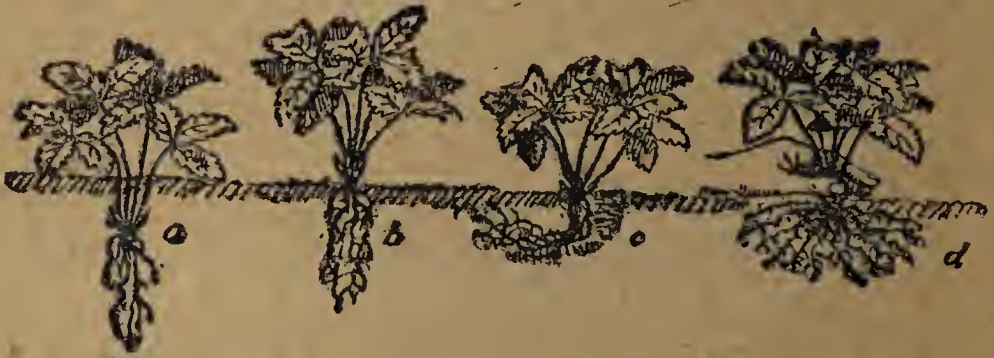


Fig. 7.—PLANTING STRAWBERRIES.

what to avoid as what to practise. The small illustrations (Fig. 7), will permit of no excuse for rough, careless, and erroneous methods of inserting the plants. The first (*a*) is sunk much too deeply, burying the heart, and cannot grow. The second (*b*) is not planted deeply enough, the neck or collar being above ground, and the roots too straight down in the hole. It will not make a strong fruitful plant. The third (*c*) has had the roots thrust into a shallow excavation, and must succumb during the first spell of dry weather. The fourth example (*d*) represents the proper way of planting Strawberries. The roots are spread out in a natural manner, the heart of the plant not being buried, while the neck or collar is not exposed to the air to become hard and dry, with the inevitable contraction of the sap vessels. A plant thus placed in the ground will, in a few months' time, be worth a dozen of the others. Plant with a trowel, not a dibber, so that the base of the crowns is just within the soil; fix the plants firmly and water them well.

When a square of land, no matter of what size, cannot be occupied with several rows of Strawberries, marginal lines may be

conveniently and profitably grown by the side of paths. This plan should be more common in small gardens. These edgings occupy little space and bear bountiful crops that are handy for picking. A row is shown in conjunction with dwarf and standard Currants, in Fig. 8. Insert the Strawberry plants a foot apart, and there will be no vacant spaces between them in a year after planting.



Fig. 8.—STRAWBERRY EDGING.

General Management.—This consists in snipping off the runners as fast as they form, except when they are wanted for producing young plants ; giving all the soap-suds possible during the period of growth, and an occasional soaking with liquid manure when the fruit is swelling, but not after colouring commences ; hoeing the ground frequently to prevent the growth of weeds ; and covering it with straw or other suitable material for keeping the fruit clean, as heavy rains often dash the soil into the berries, and spoil them. When the crops are gathered, cut off and clear away the runners (except those required for stock), also exhausted leaves, but preserve the healthy foliage. Resume the use of the hoe, and maintain a loose, weedless surface.

During the first crisp frost in autumn, all runners and rubbish having been cleared away some time previously, and the ground between the rows lightly pointed over with a fork, turning in a little short manure (deep digging with the spade being injurious), cover the ground two or three inches thick with partially decayed manure containing a good amount of short stained straw. This must not be packed closely round the plants; it will be washed by the winter rains and be perfectly sweet by the spring, forming a close, clean cushion for the fruit to rest on. The covering also prevents the escape of moisture from the earth by evaporation, and it is retained for the support of the plants and crops—a most important point in dry hot weather when the fruits are swelling.

When the manure covering is omitted in the autumn, straw should be spread between the rows some time before the fruit ripens. This is often deferred till it is colouring, and the trusses have to be raised and the stalks bruised by placing it under them—a most reprehensible practice. Better by far is it to apply the covering before the plants are in flower, as the work can then be completed much more expeditiously, and without injury to the crop. Where conveniences exist for passing the straw through a “cut box,” such as is used to prepare food for horses or cattle, severing it into inch or two-inch lengths, it can be very quickly spread on the ground amongst the plants for keeping the fruit clean, while the movement of slugs is baffled, as they cannot travel over the unstable particles.

The ground for Strawberries should be well worked, and enriched to the depth of eighteen inches or more; then, if light, made firm; but if it is in a condition to grow Cauliflowers, Onions, and Lettuces well, it will suffice for a good yield of excellent fruit. Much inferior subsoil should never be brought to the surface when digging or trenching for either this or any other crop. If, when such preparatory work is in progress, 6 ozs. of basic slag per square yard is incorporated with the soil, it will be of great benefit. This is at the rate of 16 cwt. per acre, but it is cheap,

and would be effective for three years. For application in February a mixture of 3 parts superphosphate of lime, 2 parts sulphate of potash, and 1 part sulphate of ammonia, 3 ozs. per square yard, 8 cwt. per acre, might be a profitable application in not very fertile soil. Nitrate of soda evenly sprinkled between the rows (not on the plants) when flower trusses are rising is helpful to the fruit. 1 oz. per square yard is ample.

SHORT SELECTION FROM 100 VARIETIES.

1. **ROYAL SOVEREIGN.**—The most extensively grown early Strawberry; a good grower and free bearer of bright firm fruits.

2. **SIR JOSEPH PAXTON.**—A general mid-season favourite of long proved merit.

3. **LAXTON'S MAINROP.**—Heavy, firm.

4. **VICOMTESSE HERICART DE THURY** (also sold as Garibaldi).—Hardy and productive, the large fruits being excellent for dessert, the smaller in demand for preserving whole.

5. **NEWTON SEEDLING.**—Somewhat late, very free and firm; a good traveller, and useful for preserving.

6. **GIVONS LATE PROLIFIC.**—Very heavy cropper, good flavour, late.

7. **COUNTESS or DR. HOGG.**—For rich flavour, but they are not always free bearers.

The first four are the most generally reliable, but newer varieties of promise—such as Fillbasket, Reward, King George V.—and others are worth trying to test their adaptability to any particular soil. Those that succeed the best can be increased the most. Strawberries are notoriously capricious, and the most suitable for any particular locality and purpose can in no other way be determined so well as by experiment. ~

Packing the Fruit.—Selected fruits placed in the market in the best condition, without bruises or abrasions, always realise high prices, and especially if arranged in neat receptacles such as purchasers can take away with them. Round chip punnets (Fig. 9) have long been used for this purpose. They are made in different sizes, and those about six inches in diameter, and two deep, are in favour for fine fruits. For later pickings of smaller fruit, narrower and deeper punnets, known as “deep pounds,” are

preferred. They are packed as shown in Fig. 11, below, a number being arranged in a box. The boxes may be deep enough to hold two or more tiers, the movable floor for the upper resting on battens nailed on the sides of the box. In this case



FIG. 9.

PUNNET OF STRAWBERRIES.



FIG. 10.

CHIP BASKET OF STRAWBERRIES.

the fruit must not be piled above the edge of the punnets. Punnets can be procured through most dealers in horticultural sundries, and are quite inexpensive. They are made co-operatively in Hampshire, and the system should be considered in other fruit districts.

Square chip baskets have come into favour, and are tempt-



FIG. 11.—PACKING PUNNETS OF STRAWBERRIES.

ing when neatly filled with good fruit. They are cheaper than the punnets, not costing more than a farthing each

in quantity. They are about five inches across the top, three across the bottom, and three deep. They do not hold quite a pound of fruit, but when this is fine and in the market early, scores of thousands sell for a shilling each. One of these baskets is shown in Fig. 10, page 24. The handle bends down and fits closely over the edge of the basket, then any desired number, according to the size of the box, can be arranged as in Fig. 12. It is a common practice to have a number of boxes about $3\frac{1}{2}$ inches deep, and make a stack of five or six of these, binding them tightly together for market. A few Strawberry or soft Rhubarb leaves without mid-ribs are spread on the fruit before placing on the lid.

Strawberries should be gathered for travelling when dry, and before the fruit is overripe ; each, for dessert, with $\frac{1}{2}$ -inch of stalk attached. They should be firm and bright. If too ripe they arrive at their destination dull and soft. Above all things growers should treat their customers as they would themselves be treated if buying instead of selling, and not attempt to deceive by "topping" with extra fine fruit, while that below is inferior. Smaller fruit for pre-



Fig. 12. —PACKING CHIP BASKETS OF STRAWBERRIES.

serving is gathered without stalks, and does not receive the same care in packing in stout peck baskets, but it should never be forgotten that the better it is presented the better the price it commands. These remarks apply to all small or "soft" fruits, and it will not be necessary to repeat them in treating of different kinds,

In sending choice Strawberries by post, each fruit should be placed in a soft, stalkless Strawberry leaf, and packed closely in boxes two inches deep, the fruits to be covered with leaves for the lid to rest on, and hold all firmly, but not to squeeze the fruit.

RASPBERRIES.

Raspberries are among the easiest of fruit to cultivate, and the most certain to afford profitable crops when justice is done to the plantations. Except in the best managed gardens, Raspberry-culture is practically ignored. It is true that clumps or thickets are plentiful, but they practically grow themselves, or if attention is bestowed on them it is very far from being of the best. Of what does it consist? Allowing all the young canes that push up from the roots to grow into a crowded mass during the summer, one spoiling the other; then in winter, or more likely in spring, cutting some of them out with the dead bearing-caness of last year, bundling the rest together; next, with a spade, digging deeply between the rows for burying weeds, and, perhaps, manure, at the same time mutilating the roots. That time-honoured method of so-called culture is absolutely wrong, and with a change in practice, the value of the crop can be, often has been, and it is hoped will be more than doubled in two years, without a penny of extra expenditure being incurred.

An example—the narration of a positive fact—will render the matter clear. In a large and good garden, in which excellent vegetables and most kinds of hardy fruits were grown, the Raspberry plantation was unsatisfactory. After trimming and tying up the canes in February or March, manure was liberally added, often so liberally that it could with difficulty be covered by digging it in with spades. It was done, however, and in the process fibrous roots were turned up in masses. After hoeing to destroy weeds later on, the then dried fibrous roots were raked

off in barrow-loads. The manure and labour were worse than wasted. The plantation became weaker yearly, till at last it was condemned as worn out, and it was decided it should be left to take its chance until newly-planted canes arrived at a bearing state. The following year the old plantation was made presentable by tying, hoeing, and raking, but no manure was added, and no digging done. The result was much finer canes, and the season following a much better crop of fruit than had been seen for years. This suggested a change of treatment. Manure was spread on the surface of the ground, and left there to decay, and for years the plantation was famed for its productivity.

It was the custom to sell the fruit after sufficient had been gathered for home use; and at the price then obtainable, 6d. a quart, the amount realized was at the rate of £50 per acre, seldom less, and generally more. And this, be it remembered, from a once condemned plantation, ruined for a time by erroneous treatment, which is now far from obsolete; restored by a change to more rational methods founded on the natural habit and character of the plants.

The Raspberry delights in deep fertile soil, moist, yet not saturated. It is generally found wild not far from water-courses in openings in woods, where there is some shelter from the hot sun, but not dense shade. This suggests its adaptability as an undercrop in young or thin orchards; though when the soil is rich and deep, so that the roots do not lack moisture, the best crops are obtained in the open, and not under trees.

It is essentially a surface rooting plant, and the better the fibrous roots are preserved, and the more they are fed, the finer is the fruit. The plants also produce strong woody roots which enjoy a deep run, and the deeper and richer it is the stronger are the canes, and the better is the growth supported in dry weather. The two classes of roots thus have important functions to perform—the strong and deep to produce substantial canes,

the finer and multitudinous surface fibres to feed the crops of fruit. Bearing these facts in mind, the soil should be made friable and good to a depth of at least 18 inches, and 2 feet if possible. In preparing the ground the best soil must be kept towards the top. The lower can be enriched with rough manure and decaying vegetable refuse of any kind. Heavy soil should be lightened with whatever porous material can be collected, and if this cannot be freely mixed through the mass, place the lightest and best around the roots when planting, as the growth is often very slow when the roots are in contact with strong, clay-like soil.

Planting.—The ground being in readiness, next follows the planting. The sooner this is done in the autumn after the leaves can be shaken from the canes the better, or when they separate easily by drawing the hand up them; the next best time being when the buds commence swelling in early spring. It is most important that the roots are not dried during the process of removal; they shrink quickly, and must always be kept moist when out of the ground.

Instruction is needed on the selection of canes for planting, and their after management. Examine the illustrations on page 29 (Fig. 13); *a* is a small cane, two or three feet high, with fibrous roots; *b* the same cane, showing the effect of cutting it back at the cross mark, when planted; *c* a very strong cane, upwards of four feet high, with comparatively few roots. Most inexperienced persons would choose the strong canes with few roots, in preference to the smaller with bushy fibres, and would undoubtedly choose wrongly. Again, ninety-nine persons out of a hundred, for whose benefit these instructions are prepared, would leave the canes their entire length after planting, in the hope of obtaining strong bearing plants the sooner. The hope is a vain one. Look at the figures again; the small cane *a*, when planted, was shortened to the cross-mark in *b*, leaving the stem not more than nine inches high. What is the result? The strong canes springing from the base of *b* are calculated to bear fine bunches of

fruit, and the foundation is laid for a profitable plant, which, under good management, will yield abundantly for many years.

Now glance at *c*; the strong cane was planted, and not shortened. What is the result? The cane may or may not



FIG. 13. — RASPBERRY CANES.

REFERENCES.—*a* small and good planting cane: *b* strong sucker growths:
c strong and bad planting cane: *d* pruning and tying.

produce a few miserable fruits the first season, but whether it do so or not, it dies, and leaves nothing behind but one or two small apologies for young canes as shown. These will probably die in turn, and if not, it is not possible they can develop into a

productive bush another year, and not one in ten will produce strong bearing-caness in three years. As it is often as instructive to show the wrong as the right, it is hoped no one who reads these lines will make the great mistake of choosing long, strong, and badly-rooted Raspberry canes, and leave them their full length after planting.

In planting, spread the roots out as shown in the figure on p. 29, work free soil well amongst them, tread it down moderately firm, spread a layer of manure on the surface of the ground over them, and for a foot beyond their extension, leaving it there to decay. A few copious waterings in dry weather in summer will accelerate growth, but the manure covering will do more good by preventing the escape of moisture from the soil than several waterings will with the surface of the earth exposed to the sun. When several bushes are grown together, the canes trained round stakes, three cut-back sucker canes (*b*, p. 29) are planted triangularly $3\frac{1}{2}$ feet apart, in rows $4\frac{1}{2}$ feet asunder. Another good method of training is to have the clumps 4 feet apart in line and the stakes exactly between them, with six strong canes for bearing; three in the form of a bow are, when leafless, bent to the right and three to the left, and tied at equal distances to the stakes. This is conducive to fruitfulness, while the six or seven summer canes for succession make their growth under full exposure to the sun—no small advantage.

Summer Management.—This consists in preventing the appearance of weeds by timely hoeings, which is in every respect preferable to allowing them to grow, because much more labour is necessary for their removal, and without weeds the soil's virtues are conserved for the useful crop. Another important but much neglected operation, which should not be overlooked, is the thinning of superfluous suckers. Six or seven canes at the most, are sufficient for securing to a stake, yet twice that number often push up, and if permitted to extend, crowd and spoil each other. Those not wanted should be pulled up when six inches high (they

will grow if transplanted in showery weather), and the remainder will be the stronger, sturdier, and more fruitful.

Suckers for Planting.—Those are always the best that spring up some distance from the parent stocks. Such suckers may be left here and there to grow between the rows. In such positions they do not interfere with those which must be retained near the plants for future bearing. After the leaves fall the suckers for planting can be pulled up with a sharp jerk, securing to each a bunch of roots. Canes that have to be split from the old plants with a spade, though they may be of twice the size, are not, as previously shown, half so good for planting.

Autumn Pruning.—After the crops are gathered it is the custom to let the old canes, which have produced the fruit, remain to die, and a very bad custom it is. It is much better to remove them promptly by severing them at the bottom and drawing them carefully downwards, so as not to break the leaves of the summer canes for next year's fruiting, and the additional sun and air admitted to these will, by ripening them, greatly increase their productiveness.

Winter Work.—The sooner this is completed after the leaves fall the better. When the canes are tied to stakes, six or seven of the best and shortest jointed should be selected, and instead of tying them all above the stakes in the orthodox manner, and thus having fruit at the top only, shorten two of the canes about fifteen inches from the ground, two others at about twice that height, and the remaining two or three a foot or so above the top of the stakes in the manner shown in Fig. 13, *d*, page 29. The result of this simple method of pruning is seen in the illustration on page 32, namely, fruit nearly from the ground to 5 feet or more above it, if the canes are strong; and in hot dry summers the finest fruits will be found, not at the top of the bushes, but towards the bottom, where in the ordinary course of pruning none is produced.

Lines of Raspberries.—Training the canes, either as shown



Fig. 14.—RASPBERRY IN BEARING.

The result of shortening, as in d, Fig. 13, page 29.

for Gooseberries (page 41) uprightly, or slantingly to wires or cross laths is unquestionably good. Hedges of Raspberries 5 feet high on this system are highly productive, and if several rows are grown together the distance between them should equal, or somewhat exceed, the height of the canes. Plant them 12 inches asunder in the row, cut them down as advised, and when established, shorten every alternate cane to the first wire, and the others 9 inches above the second, which may be $4\frac{1}{2}$ or 5 feet from the ground. Another mode of training, less neat, though not less useful, is to simply arch over the taller canes right and left in the lines, tying or twisting them round each other. The bending of the canes causes many back buds to start into growth that would otherwise remain dormant, and the crops of fruit are thereby increased.

Self-supporting Canes.—More Raspberries are grown without supports than with them on fruit farms and in market gardens, also as undergrowth in orchards. For this cheap method of culture a short, sturdy-growing variety should be chosen. For a long time there was none to surpass, if equal, the true Carter's Prolific, raised by Mr. John Carter, of Keighley, and more of this was grown in that way than of all others put together. During recent years Norwich Wonder has been found to possess a greater amount of sturdy vigour, and is largely grown in the Raspberry fields of Kent. As previously mentioned (page 8), a broad line of Raspberries without stakes, laths, or wires, round Mr. W. Jacob's small allotment at Petworth, gave upwards of two quarts of fruit to the yard, and the fact is worth repeating. In open field culture cut-back canes are planted 18 inches apart, in rows $3\frac{1}{2}$ feet asunder.

Tall growers of well-proved merit, for wires and stakes, are Superlative, Rivers' Hornet and Baumforth Seedling. Any of these may be tried that are the most readily obtainable, and the number can soon be increased if desired. If one variety only is wanted, choose the first of the trio.

Raspberries are seldom gathered with stalks, and then only for dessert. For all cooking purposes they are picked as soon as the fruits are well coloured, and still firm to the touch. Kentish fruit is sent to the market in tins broadest at the base, and not quite full, so as to allow "play" for the juice. Earthenware vessels are used in some districts. They are known in the potteries as half-pippins, and hold twelve pounds of fruit. This is much decreased in value if gathered when wet.

If there is no material departure from the instructions given, a fair measure of success may be expected by cottagers and small holders of land, who have had little or no experience in growing crops of this nature for home use or market purposes.

GOOSEBERRIES.

Strawberries are delicious and wholesome, especially in their natural state, and Raspberries take high rank, especially for preserving, but both are useless when unripe; it is not so with Gooseberries. These occupy the same position early in the season that Apples do later as food products, and both are indispensable—one as the most substantial and most in demand of small, as the other is of large fruits grown in this country.

Gooseberry bushes are raised from cuttings, and the process is so simple and easily explainable that it is not conceivable that any intelligent person can fail in comprehending and carrying it out. Fig. 15 represents a Gooseberry cutting ready for insertion. It is a firm, short-jointed, summer shoot, cut from a bush in the autumn as soon as the leaves could be shaken off. Very strong growths containing much soft pith are not the best for propagating. Firm, well ripened shoots, nearly as thick as the stem of a tobacco pipe, are the most certain to succeed. They may be from 15 to 18 inches long, thus affording a sufficient length for insert-

ing firmly in the soil for rooting, with at least 6 inches of clean stem above it to the branches ; or in other words, 4 or 5 inches of the stem may be in the ground, and 10 or 12 inches above it, only the top four inches or thereabouts containing buds for the production of branches. These figures are given as approximate, for cuttings cannot always be had of the exact length desired, and an inch or two either way is not of material importance.



Fig. 15.
GOOSEBERRY
CUTTING.

It will be seen by the sketch that not only are the spines removed, but the buds are cut out except five at the top, also that the end is cut off above the highest bud. If four of the buds grow, as may be expected, and extend equally, the branches thus produced lay the foundation of the future bush.

The end of the cutting for insertion in the ground is cut square across, close to the lowest bud, not slantingly midway between the buds on the stem.

The knife cannot possibly be too sharp for this purpose, for if the bark is bruised by a blunt one the end of the cutting may decay, instead of swelling and producing roots. It is by careful attention to what the uninitiated may regard as trifling matters that success is achieved.

The next step onwards is shown in Fig. 16 (page 36), in which the cutting in a year from its insertion is transformed into a well-rooted plant with four stout branches, and also a sucker springing from the base. This sucker shows bad, not good, workmanship, for it proves that the bud from which it issued was not completely cut out, as all buds should be in making the cuttings. Growths of that nature spoil a single-stemmed bush. It is of little use cutting them back, for it will only be cutting to "come again" stronger than before, and with the number increased. It is true

some persons do not object to growths direct from the roots, but in that case they do not remove any buds; and although they may have good crops of fruit, they cannot be better than from single-stemmed trees, which are much the more convenient for working amongst, also for gathering the crops; and, broadly speaking, one kind of bush represents culture, the other slovenliness.

Supposing there is no sucker to our miniature bush, as there should not be, how are the new branches to be dealt with? If they remain unshortened, they simply elongate, the lower pair soon reaching the ground, except in the case of upright growing sorts, and are then of little further use. A great point to secure in Gooseberry-growing is to have the branches well above the soil, both for keeping the fruit clean and admitting a free circulation of air under and amongst the branches, this conducing to fruitfulness. The first young branches are thus cut back about half their length, as shown by the cross lines.



Fig. 16. —GOOSEBERRY A YEAR FROM THE CUTTING.

The effect of this is that the branches are at the least doubled in number the next season, as indicated by the dotted lines (Fig. 16). Instead of four we now have nine, and may have more. These branches need not be shortened materially, and if they do not exceed a foot in length, the removal of two or three inches from the ends will suffice; if they much exceed a foot, cut them back to that length after the leaves fall. In doing this, let an apparently small matter be attended to, for it is of far greater moment than it may seem to the inexperienced. See that the end bud left after cutting is a good one and pointing upwards or outwards,

not downwards or inwards, for the growth that follows will be in the direction in which the bud points, and if that is downwards, or towards the centre of the tree, either crowding will be induced,

or low, flat bushes formed ; we want an open bush, as upright as the variety will allow, and with the branches well clear of the ground, even when the weight of fruit drags them towards it.

Pruning.—As the bushes attain size, pruning must be resorted to, and just as it is intelligently conducted, so will be the crops. Some Gooseberry bushes in the gardens of cottagers and small farmers are never pruned, the result being small fruit and speedily exhausted trees ; on the other hand, when pruning is conducted in the absence of knowledge, it often prevents good crops of fruit. If all the young shoots of healthy trees are systematically cut back, a thicket of luxuriant growth is induced. Main branches, thinly disposed, should be allowed to extend ; the side growths issuing from these must be cut back to within an inch of the base, thus forming the spurs ; but, in addition, where there is space for a young shoot to bear fruit, such shoot should be left, because the Gooseberry, though bearing well on spurs of two or more years old wood, also produces fruit freely on firm annual shoots, when these are not overcrowded.



Fig. 17.
GOOSEBERRY BRANCH, ONE
AND TWO-YEAR-OLD WOOD.

Fig. 17 shows a Gooseberry branch.

the thicker and darker part of which is two years old, the thinner and lighter wood of one summer's growth. It will be seen that natural spurs are forming on the former, also that three side growths have been cut back at X X X. If these had not been shortened, the interior of the bush would soon have become so crowded that the hand could not be passed down between the branches for gathering the crop. A very simple guide for the pruner is to let the branches be far enough apart to easily admit the hand between them without coming in contact with the spines. A young shoot



Fig. 18.—HALF PRUNED GOOSEBERRY BUSH.

may be left here and there, one of these being shown in Fig. 17. If there had not been space for the hand to pass down between the two, the shoot would have been cut back like the three others : but as there is room it is left, and every bud on it may produce blossom, to be followed by fruit. It is desirable to retain young shoots their full length, or nearly so, in good-sized bushes, even if an old wearing-out branch is cut out or shortened, to make room for them ; there must be no overcrowding, but always space for reaching right into the centre of the bush.

Now examine the branch (Fig. 17, page 37), of two-year-old wood with spur, and one-year-old wood with spines and buds only, in connection with the bush shown in Fig. 18, page 38, and it will be apparent that this bush is composed of a number of those branches. In order to make the subject of pruning so clear that it cannot be misunderstood, half the bush is represented as pruned, the other half unpruned. It will be seen that in the



Fig. 19.—BEARING BRANCH AND SUMMER PRUNING OF GOOSEBERRY.
(See page 40.)

pruned part, space is afforded so that the hand can pass down to the base of the branches for gathering the fruit. A bush soon ceases bearing, except on the outside, if the unfortunate thicket system is permitted to continue, and it will become worse during each year of neglect in pruning. The main branches should not be less than 9 inches, and are better a foot asunder.

Cropping and Summer Pruning.—It now remains to show the results of keeping the branches thinly disposed for the production of spurs, which cannot form when the growths are crowded. Fig. 19, page 39, represents the individual branch of a Gooseberry bush on which spurs have formed, blossomed, and produced fruit. This is no imaginary branch, but a “lesson from life.” It will be seen that young shoots are pushing from the upper side of the branch, and if all these were permitted to extend, they would overcrowd the branches above, and exclude light and air from them. This evil can be averted by nipping the ends off several of the young shoots in June, as in XX, page 39. This method of “summer pruning” is not half sufficiently practised. It prevents crowding and promotes fruitfulness. Every shoot may be pinched or cut off when five or six inches long, leaving two or three pairs of leaves on the part left, only allowing a shoot to extend here and there when there is room for such extension, in accordance with the principle already described. As often as other growths follow the topping and extend two or three inches, pinch them off to one leaf. Fruiting spurs will then form, and fruit follows exactly as shown in the engraving. At the winter pruning cut back the summer-topped side shoots to clusters of buds near the main stems as indicated by the marks XX in Fig. 17 (page 37).

The Gooseberry is one of the most certain, profitable, and reliable of fruits. As soon as the berries are large enough they are picked, and used in a green state, thinning the crops. The berries that remain then become larger for gathering ripe later on. By that practice two crops are had from the same plantation.

Two-year-old bushes grown two feet apart will produce at the least a pint of fruit in three years, probably much more, and the value of this, at the price of a shilling a peck, is at the rate of over £30 an acre. They may be grown at that distance until they touch each other, then half of them can be taken out and replanted at wider distances for development, if it is desired to

extend the plantation. In six years the above value of the crop will be doubled. They may be planted in the autumn or spring.

Gooseberries for Hedges, Walls, or Fences.—Particular attention is directed to the plan now to be recommended. More fruit can be had from a given extent of land in this than in any other way. The plants may be about a foot apart, each preferably with a single stem: otherwise plant thrice that distance asunder, taking three stems from each as represented in Fig. 20. They

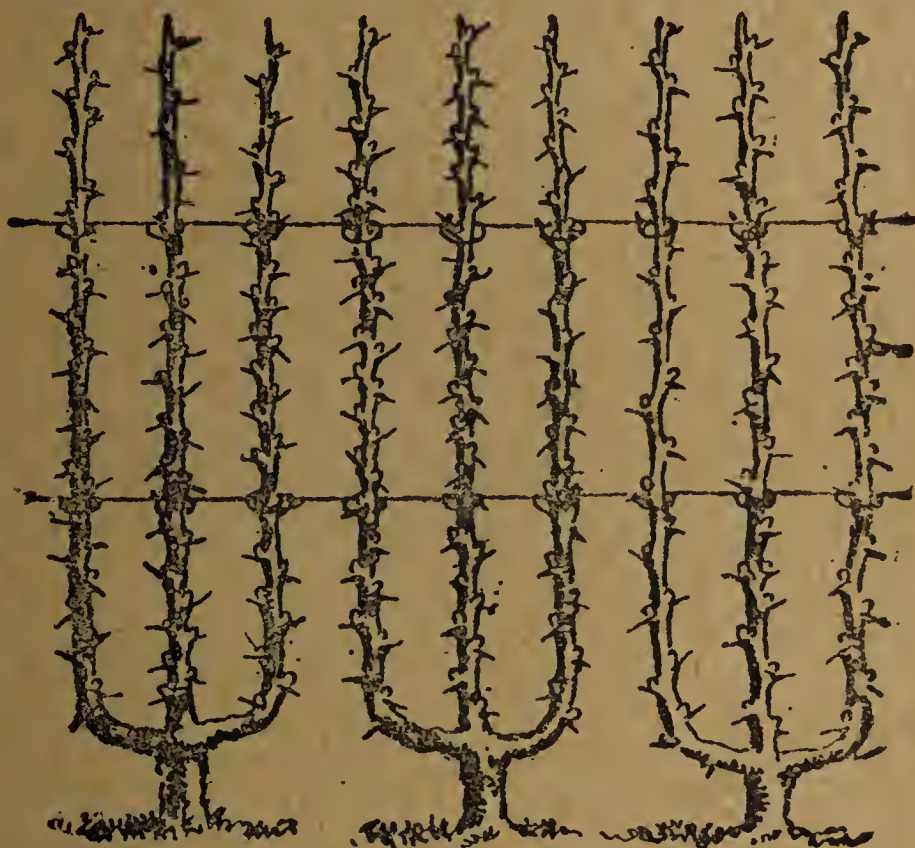


Fig. 20.—A GOOSEBERRY FENCE.

may first be secured to upright stakes, and eventually to cross-wires fixed to posts. All that is necessary is to pinch the side growths when they push about six inches in summer, as previously advised, and let the leading shoot extend. Upwards of 300 fine fruits have been gathered from a stem four feet high, and it is remarkable that birds neither attack the buds nor ripe fruit with anything approaching the persistency they often do in the case of ordinary bushes. A Gooseberry "hedge" can be the soonest and in the easiest manner established by confining each plant to a single

stem. Upright growing sorts should be selected. Among the best of several that form a productive line, five feet high, in a Surrey garden, where fruit is well grown, are Prizetaker, Green Laurel, Rifleman, May Duke, Industry, White Captain, Whitesmith, Red Champagne, Early Sulphur, and Dan's Mistake.

Soil.—Rich, deep, fertile soil is preferred, not a poor, dry medium. Soil that will grow first-rate crops of Wheat or Potatoes will also grow good Gooseberries. With dry soil, manure should be spread thickly on the ground over the roots, and left there to decay.

Manuring.—When the young wood much exceeds a foot in length the ground will be rich enough; if it does not attain that the land must be enriched. In the absence of stable manure, a mixture of three parts superphosphate of lime, two parts kainit, and one part sulphate of ammonia, applied in February at the rate of from 2oz. to 3oz. per square yard (5 to 8cwt. per acre) according to the growth, will be a suitable application.

Varieties.—For affording abundant crops to be gathered in a green state from bushes, for cooking, bottling, or preserving, any or all the following are suitable:—Whinham's Industry, Keep-sake, Crown Bob, Whitesmith, and Lancashire Lad. The first and second named are valuable because attaining a good size early. All varieties do not thrive equally well in different soils, but those named are not likely to fail, and the sorts that succeed the best in any particular garden can be propagated the most extensively. Crown Bob thrives on poor chalky soil. For gathering ripe, for preserving, and keeping late, no variety excels the Red Warrington. For early eating, Early Sulphur is one of the best, and the richest of all for dessert is Red Champagne. Three excellent newer sorts are Langley Beauty, Langley Gage, and Golden Gem.

Enemies.—The greatest of these are birds, such as bull-finches and sparrows, which destroy the buds in the spring; caterpillars, which eat the leaves, destroying the crops, and seriously injuring the trees in the early summer; and American mildew, which attacks foliage and fruit (see Appendix).

Where the bushes are not numerous, and the branches at the distance named at the foot of page 39, it is not half so tedious as it seems to smear them with the following mixture, covering every particle of stems and buds with the aid of a painter's brush: Take fresh lime and soot, nearly double the quantity of the former, also some clay, and mix them to the consistency of paint, adding also some melted grease of any kind obtainable. This mixture adheres for months, and birds seldom pick out the buds, while caterpillars rarely attack the leaves, and the stems are kept free from moss. A quicker method of covering the stems with a bird and moss antidote, is to throw freshly-slaked lime amongst them when every twig is wet on a still morning, after a heavy mist or fog. If the work is well done, the trees will be quite white when dry, and the lime that falls on the ground will be of benefit as a manure. If caterpillars appear, syringe or sprinkle bushes, then dredge them when wet with hellebore powder, which will destroy all that are reached. A few hours subsequently, if the berries are large and must soon be used, syringe well with clear water to wash off the powder, which is poisonous; but where lime is used as above directed, freely and regularly, caterpillars seldom trouble the bushes.

CURRANTS.

Estimating the crop of a fairly well-grown Currant bush at the moderate weight of 10 lbs., and the value of the fruit at even a halfpenny a pound, the crop will be worth at the rate of nearly £40 an acre, with the bushes five feet apart; but as all experienced cultivators know, the yield is often much greater than that, and the price stated is distinctly below the average. It follows that the growing of Currants might be pursued with advantage by persons who have good ground at disposal.

There are two kinds of Currants—Red and White, and Black. The Red and White require identical treatment as regards propagation



Fig. 21.—A RED CURRANT BUSH (WINTER PRUNED).

and pruning; but the Black is wholly different in habit, and must be managed accordingly, in the way that will be described. The



Fig. 22.—A FRUITING BRANCH OF RED CURRANT.

White Currant is more of a “fancy” than a serviceable fruit, and one bush of it to fifty or even a hundred of the Red and Black

will suffice as a rule, apart from personal preferences or special local requirements.

A Red or White Currant bush is formed in the same way as a Gooseberry bush, and the figures (pages 35-36), with the accompanying instructions, may be followed in raising and establishing both; but as soon as a sufficient number of branches are produced to form a Red Currant bush, additional young growths should not be encouraged. A few sketches will make the process quite plain. Fig. 21, page 44, represents a Red Currant bush pruned and ready for bearing. It averaged 20 lbs. of fruit annually for seven years. There are nine branches, most of them five feet in length. Seven as a rule suffice, but as there appeared room for two more, they were allowed to extend, branching from the mains on the left of the figure. Nearly all the buds on the stem are blossom buds, but there are a few wood buds amongst them, that push growths in the summer. These are first pinched back to two or three pairs of leaves in June, as shown at XX, in the fruiting branch, Fig. 22 (opposite), one growth being left unpruned to show the difference, for it ought also to be taken off like the two others. In winter these summer-shortened growths are cut back close to the clusters of buds at the base, as shown on the enlarged three-year-old branch (Fig. 23), this being one of the branches of the bush in Fig. 21 opposite. It will now be seen how easy it is to prune a Red Currant bush



Fig. 23.—GROWTH OF RED CURRANT, WITH SPURS AND BUDS.

properly ; also how readily inexperienced persons may go wrong without these "object lessons" to guide them.

There are two important points still to be mentioned, and they should not be forgotten. The first is, to have the main branches so wide apart that not the hand only of a man can be passed easily between them after pruning, but there should almost be room for his head. The fruiting branch (Fig. 22) shows both the necessity and the result of a foot of space between the branches after the pruning is completed. The crop is not in the slightest degree exaggerated, but such yields cannot be had from crowded bushes, nor can they be gathered half so quickly as when the main branches are thinly disposed.

The next point to be remembered, is not to allow a great length of young wood to remain at the ends of the main branches yearly ; the growth may extend to a foot in summer, and then be topped, but should be cut back in winter to eight inches. If more is permitted, fewer spurs will form, and consequently less fruit follow.

Standard Currants.—Most persons know what standard Roses are, and those who have not seen standard Red Currants may be told that they are nearly as ornamental as standard Roses, and much more useful ; they are, moreover, very easily produced.

A Standard Currant tree, nearly full-grown and pruned ready for bearing a heavy crop of fruit, is shown in Fig. 24. The pruning for forming the head is exactly the same as already described for low bushes, and all that is needed is the narration of the process for producing the stem. Choose strong, yet firm, young shoots, as soon as they are ripe and the leaves have fallen, for cuttings. These may be eighteen inches or more in length, and the eyes or buds must be carefully cut out of the lower six inches, and inserted carefully in sandy soil. Do not remove the tops of these cuttings, but place a tall stick to each, and secure the leading shoot to it as it extends, pinch the side growths that push from

the stem as soon as two leaves form, and as often as other growths follow pinch the tips out at one leaf. Continuing the practice, the stems are covered with green leaves, which assist them to thicken, and the sap flows the more freely upwards to support the head. Allow the leading growth to attain to a height of four feet, then, when the leaves fall, cut off the top about six inches below that height, and four or five shoots will push in the spring for forming the head. At the end of the third year all the pinched-back growths may be cut from the stem.



Fig. 24.—STANDARD CURRANT (WINTER PRUNED).

But what is the use of such trees? They can be grown by the sides of paths in gardens with other crops between and under them, the Currant crop being practically a distinct gain, and of substantial value. The small sketch (page 21) will explain the matter better than a thousand words. A strip of ground about five feet wide is occupied with dwarf Currant bushes along the

side of a walk. Managed as above described, these bear 20 lbs. of fruit each; but plant standard Currants between them and allow only 10 lbs. of fruit for each, and it is obvious that the value from the same plot of land is increased fifty per cent., because the standards rising above the dwarfs as shown in the figure, do not impair their productiveness. Now have a marginal row of Strawberries planted a foot from the path, and the same distance asunder in the line, and ornament will be combined with utility.

The Red Dutch is one of the best Red Currants for standards, and is good also for bushes: but the true Knight's Sweet Red, of Mr. Pearson, Lowdham, Notts, is perhaps better. Raby Castle (also known as Victoria) is later and valuable, because being a fine grower and good bearer of excellent fruit. If a few extra large fruits are desired for exhibiting at cottagers' shows, the Red Grape or La Versaillaise will produce them. The only White Currant that need be grown is the White Dutch Cut-leaved, and one or two trees will suffice for small gardens. The bushes prefer an open situation, and the manure mixture advised for Gooseberries (page 42) is suitable when assistance is needed.

Black Currants.—This most useful fruit is quite distinct from the foregoing, and requires entirely different treatment. It will grow in stronger and moister soil than, perhaps, any other fruit, and if one position in a garden is cooler and damper than the rest, it may be planted with Black Currants: the bushes also grow and bear well in good soil under trees, where the sunshine can pass down between them and filter through the branches. Black Currants are in great demand for cooking and preserving, and good crops of fine fruit are very profitable, but they cannot be grown remuneratively in dry and poor land. Some of the most profitable bushes seen by the writer grew on the sloping banks of a wide ditch or stream that passed through a cottager's garden. They bore on an average thirty pounds of fruit each, which sold for 2d. a pound. The bushes were six feet through, and overhung

the water. The crops were not easy to gather, but beyond the little trouble involved in that respect they cost absolutely nothing to produce, and the bushes occupied a position on which little else could be usefully grown.

Black Currant cuttings may be made and inserted in the way advised for Gooseberries on page 35 for raising the single-stemmed plants which many people like ; but many fruitful bushes are raised from cuttings inserted without the removal of any buds. These produce suckers which, although objectionable when springing from the stems beneath the surface of the ground in Gooseberries, and often ruinous in the case of Red Currants, are advantageous rather than otherwise to the black-fruited kind. The crops are borne mainly on the young shoots of the previous year, and the stronger these are, as a rule, the finer the fruit : and as the suckers make strong branches, by encouraging their production and cutting out the older and weaker parts the bushes remain profitable for a number of years. Baldwin's is a very fine Black Currant, and clean healthy bushes of it, also of Black Naples and Lee's Prolific, are almost invariably profitable. The newer Boskoop Giant is the largest of all, and excellent.



Fig. 25.—BLACK CURRANT BUSH.

The character of a Black Currant bush is displayed in the small sketch, Fig. 25. As will be seen, there are no "spurs" as in the Red Currant and Gooseberry, but the branches are simply studded with buds ; strong suckers are also seen pushing from the ground

a little distance from the main stem. All that is necessary in pruning is to thin out the older and weaker parts to give the

stronger more room, and these may be five or six inches asunder. As further elucidating the matter a branch is shown on a larger scale in Fig. 26. The old wood is dark, the young lighter. The best fruit will be borne by the latter; therefore, when the branches are too close together, the old, as represented by the central one, should be cut out at the cross-mark. A shoot will push from the bud below for bearing another year, and one older near it can be removed to give room for it. The simple routine of pruning Black Currants is cutting out old branches and encouraging young growths. A modern and very successful method of pruning Black Currants is to treat the plants in two batches, cutting each batch hard back in alternate years. Where "big bud" is rife this plan is admirable. The bushes do not bear in the year they are cut back, but fruit heavily the next.



Fig. 26.—BRANCH OF BLACK CURRANT, SHOWING OLD AND YOUNG WOOD.

Digging and Manuring.—Currant bushes should not be dug amongst with the spade, but the ground may be pointed over carefully with a fork. Manure, especially for Black Currants, which

produce fibrous roots near the surface, and suffer from drought, is best spread on the soil and there left to decay. Lime is good for Currants, and if it is dashed amongst the branches when wet, for adhering and destroying moss, enough will fall to the ground for the roots. As a supplement to the manure (page 42), common salt is good in dry soils, applied at the rate of 2 or 3 cwt. per acre, or a little more than one ounce to each square yard, in dry weather in March. If the growth is not free, the same quantity of nitrate of soda would be better, applied in April.

Enemies.—Small green and black flies (Aphides) are the chief enemies of the Red Currant; they attack the tips of the young shoots, the leaves curl, and growth stops. The quickest method of riddance is to nip off the points of the shoots and burn them, though soap-suds as hot as the hand can be borne in for a quarter of a minute will destroy many and not injure the trees. Black Currants are liable to be ruined, as thousands have been, by a practically invisible mite (Phytoptus) attacking the buds, which swell to the size of large Peas, but no growth follows. One of these buds may contain 200 mites. No certain cure has yet (1917) been discovered. When attacks are first seen, and only a few buds are swollen, they should be picked off and burnt forthwith. If the evil gets quite out of hand, the only effective remedy is “stamping it out” by digging up and burning every scrap of the infested bushes. Cuttings should never be taken from such bushes; and if fresh ones are obtained, they must be planted as far distant as possible from the site of infested plantations (see also Appendix, page 127). The variety Boskoop Giant is, perhaps, the least frequently attacked by the destructive pest.

APPLES.

Unquestionably the Apple is the most important, because the most substantial and serviceable, fruit of temperate climes, and it is very apparent that the increase of home-grown fruit of best quality has not been commensurate with the demands of an ever increasing population. How is a change to be effected? One thing is clear, if we stand still American growers will not and the worse our samples become by neglect, the better will theirs become by cultivation; and the best samples, no matter whence they come, or what they are called, will find the readiest sale. Let it be said emphatically that the **ONLY WAY TO COMMAND A SALE FOR HOME-GROWN APPLES IS TO IMPROVE THE SAMPLES**, and this can be done. It is pitiable to see the generally low grade of the produce of gardens and orchards attached to British homesteads; and it is because of this inferiority, more than anything else, that imported fruit finds its way, not to populous cities only, but to small country towns, and even rural villages. For improving the market supply of British Apples there must be a considerable limitation of varieties, as then only can the best and most uniform supplies be insured. This is the American plan, and by carrying it out in its integrity confidence has been gained in their consignments, and a great trade, creditable to them but humiliating to us, established in our markets.

Raising Apple Trees.—The habit of raising Apple trees from pips in cottage and other gardens, and growing the trees till they bear, then retaining them, however inferior the varieties, must be abandoned. That is the origin of thousands of worthless Apple trees. It is true that superior sorts have been obtained from seeds, but for one such at least a thousand have proved utterly useless after occupying space for ten or twenty years. Young trees can only be justifiably raised from pips for

producing stocks on which sorts of proved merit can be grafted. But there are other kinds of stocks, dwarf in growth, and quick in flowering. When small fruitful bush trees are wanted in the shortest time they should be bought from nurseries. They are the cheapest of trees, and soon repay the outlay.

Stocks for Apples.—These vary greatly, influencing the growth of the varieties established on them and also the crops of fruit they bear. The same variety of Apple was grafted at the same time on different stocks, and the trees grown together in the experimental garden of the Royal Horticultural Society. The blossoms following were counted. At the end of five years the tree on the French Paradise had produced 460 blossoms; on the Broad-leaved Paradise, 185; on the Crab, 23. But a tree may produce too many blossoms when quite young, and become stunted—a mere toy. This is often the case with trees on the first-named stock, in some soils. We must have regard to the growth as well as precocity. Seven years after grafting near the ground, and the trees grown as bushes, that on the French Paradise was nearly 3 feet high, with more than 300 blossoms (too many); that on the Broad-leaved Paradise was 5 feet high, with 150 blossoms, quite sufficient for a crop. The tree on the Crab had no blossom that year, and was upwards of 6 feet high. These particulars were taken by the writer, and are accurate. The Broad-leaved Paradise stock, then, combines free growth with fruitfulness, and trees grafted on it are suitable for growing, either as useful bushes (see page 14) or dwarf standards in the gardens of cottagers and small holders of land. The Nonesuch is a valuable stock for dwarf bush trees, imparting sturdiness with productiveness. Tall standards for orchards or on grass must be grafted either on Crab stocks or selected “free” stocks. The latter are raised from pips, and vary in character. For raising large numbers the seeds are obtained from cider-mills.

Soil and Situation.—As before indicated, land of a staple that will grow good crops of Wheat, Potatoes, or Cabbages, will

grow good Apples. It should be well worked to a depth of 2 feet, the subsoil being broken up, but not brought to the surface. If water stand 2 feet below, drains should be laid 5 yards apart and $3\frac{1}{2}$ feet or more deep, with proper falls and outlets. If this is not practicable, plant the trees on mounds above the general level, and keep the soil covered with manure, especially in summer, so as to attract and retain the roots near the surface, for if this is dry in hot weather, they will go downwards to the water, and remain there to the detriment of the trees. There may not be much choice as to site, but if there are damp hollows and higher and drier ground, choose the latter, as the roots will be warmer, and the blossoms have a better chance of escaping injury by frost, for the drier the air the less they are damaged.

Purchasing Trees.—First look to the character and position of the vendors, and deal with those who have reputations to maintain. They cannot afford to sell inferior trees, or what is of vital importance, distribute varieties under wrong names. It is a very serious matter to grow fruit trees for some years, then, when they bear, find they are not the sorts ordered, but inferior. Time thus lost cannot be regained. Order early in October, and the sooner the trees arrive and are planted after the leaves fall the better they will grow. Many are planted in spring, and answer very well; and it is better to plant just when the sap commences moving and the ground is in good order, than in mid-winter when it is in a cold, wet, adhesive state. The best trees are sold first, or in the autumn, and they should be ordered then. If they cannot be received till spring, and the roots arrive in a very dry state, plunge them in water for a day before planting. Do not buy so-called “cheap” trees sold in markets in April, with the roots as dry as hay through long exposure. They are the unsold stock of nurseries, and may or may not be true to name or live. They cannot be trusted to give satisfaction.

Planting.—The best of trees are spoiled by bad planting, and it is deplorable to see how roughly the work is often done

through lack of knowledge. A man must be taught the work before he can plant a tree properly. He may honestly believe he is doing work well that he does not understand, when, at the same time, he is entirely wrong. It is intended that there shall be no excuse for bad planting by persons who read the instructions here given, and it is hoped they will act in accordance with them.

The subject cannot be made clear to the inexperienced without the aid of sketches: with them it can scarcely be misunderstood, therefore a few are provided. Three trees are outlined in minia-



Fig. 27.—PLANTING APPLES.

ture for the purpose of directing attention to the roots. In Fig. 27, the first tree (a) shows bad planting, either in the garden or grass field. The second (b) represents good planting in drained land. The third (c) shows how planting should be done on wet ground, in which water may stand within 2 feet of the surface. An ordinary man who has not been taught how to plant trees, will almost certainly proceed as if digging a hole for a post, push the roots down in it a foot below the surface, cover them thickly with manure, stamp it down, pile the soil up around the

stem, then, if in a grass-field, place on the grass in the form of a neat mound. The tree may not die in the first season, but it is impossible it can flourish with roots twisted in, and surrounded with soil almost as firm as a wall, while the mound effectually excludes moisture. Trees innumerable have been prevented from growing by that rough and erroneous method of planting, which should forthwith cease.

The right method is to spread out the roots as in *b*, the soil beyond their extremities being well broken up to the extent of at least three feet from the stem, and preferably twice that distance; indeed, it is best to have the ground well worked throughout. If the site is not wet, the roots near the stem may be just below the ground line, the fibrous portions very slightly inclining downwards; good soil should be worked well amongst them, but not manure, and they may be covered about four inches deep, pressing down the soil carefully till it is moderately firm, but not hard, and finish by spreading three inches of half-decayed manure or vegetable refuse on the surface, and for a foot beyond the extremities of the roots.

Exactly the same course as to spreading out the roots to their full extent must be followed in planting in wet land, but they may be arranged on the surface or nearly so, as shown, digging soil from around for working amongst them, and covering as before, then adding manure as above advised. Each tree will then be distinctly on a mound, and it is important that this be three feet wider than the spread of the roots, or in other words, their extremities should be eighteen inches from the outside of the mound. It is surprising how well trees grow and bear in wet, low-lying soil when thus planted, especially if the outer edge of the mound be thickly covered with manure or litter of any kind in summer, to keep the soil moist there. This encourages the multiplication and extension of roots near the surface, and these produce fruitful wood; whereas, if the roots are driven down to the cold wet subsoil in search of moisture, the growth resulting,

though it may be strong, is essentially unfruitful. If a layer of soil and ashes from burnt vegetable refuse be spread on the mounds annually, and a covering of manure given in summer, the trees will continue in a profitable bearing state for many years.

Three main points to be kept in mind when planting, are:—(1) always make excavations much wider than the length of the roots when they are laid straight out; (2) never sink the stem more than an inch deeper than it was before the tree was dug up from the ground, judging by the earth mark on the bark; and (3) never plant when the soil is in a very wet, unworkable state, but bear in mind previous remarks on this subject.

Root and Branch Pruning.—Though the figures on page 55 show how planting should and should not be done, they are too small for showing the character of the roots, and the treatment these should receive—a matter of vital importance. As the roots are, so will the growth be. As a rule, too much attention is paid to the tops of trees, and too little to the roots. A tree with a small top and a plenitude of healthy fibrous roots in good soil, will arrive at a profitable bearing state long before a tree with a large top and a few unhealthy roots. Look then to the roots; they are as the main-spring to the watch, or fuel to the engine—the motive power. If damaged, they must be repaired and put into the best working order when planting.

As it is quite certain that the majority for whose benefit these instructions are intended know little or nothing about the nature of the roots of trees, and as it is absolutely essential they should know something of the subject, particular attention is invited to the two following sketches, for they teach valuable lessons.

When a tree is dug from the ground, the roots are more or less broken. Even with the greatest care they cannot be retained in their integrity. As a matter of fact, trees are often dug up quickly, and the strong roots roughly chopped off or broken. This is not of great consequence if they are rightly treated, but if

neglected the results may be serious. A torn or jagged wound in the flesh heals slowly, a clean cut heals quickly. So it is with the roots of trees. Look at Fig. 28; the main roots were broken, and planted with their ends jagged. What was the result?

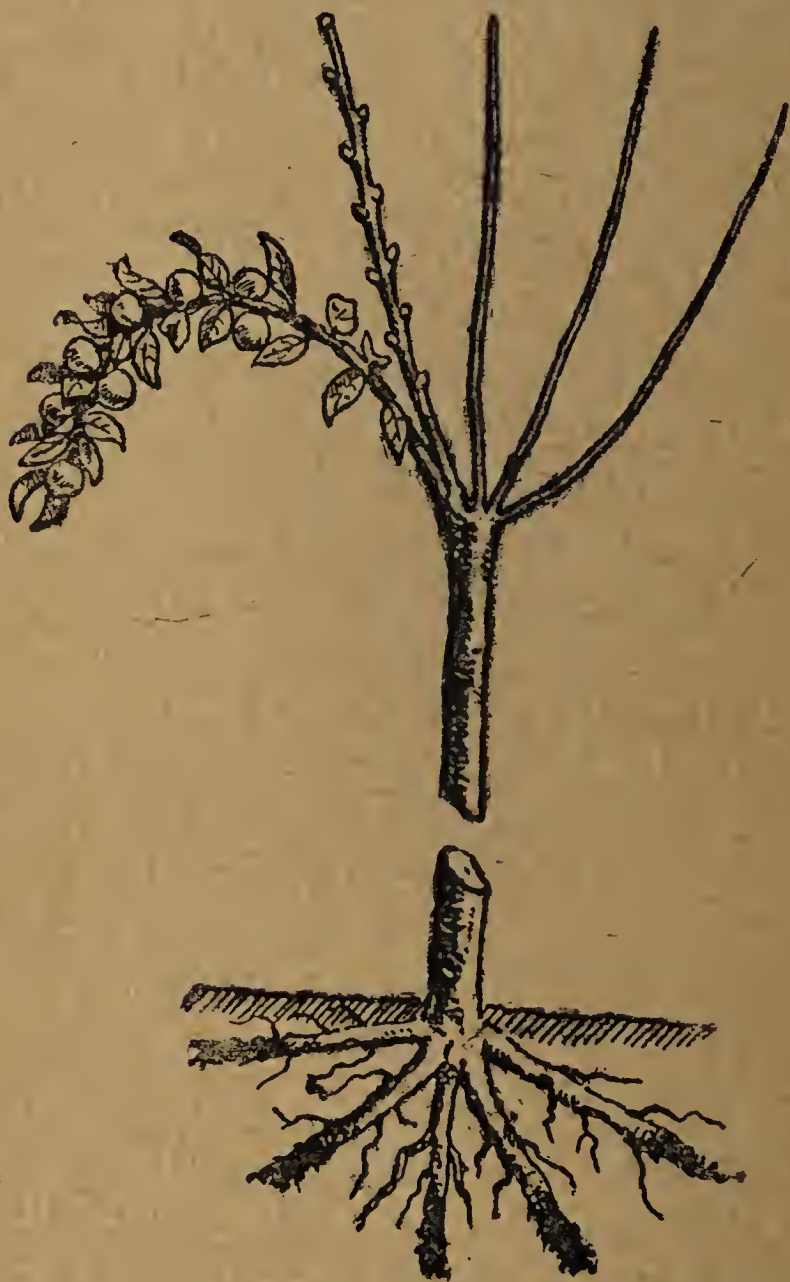


Fig. 28.—BAD PRACTICE IN PLANTING AND NON-PRUNING.

Decay, as shown by the dark portion, few fibres issuing for supporting the tree, and scarcely any growth followed. Now turn to Fig. 29 (page 59); the jagged ends were cut smoothly off. Result: the wounds healed forthwith, swelled at the end, and produced fibres

freely, these in turn pushing the tree into growth. The root force of this tree, in two years after planting, was five if not ten times greater than the other, and the growth differed proportionately.

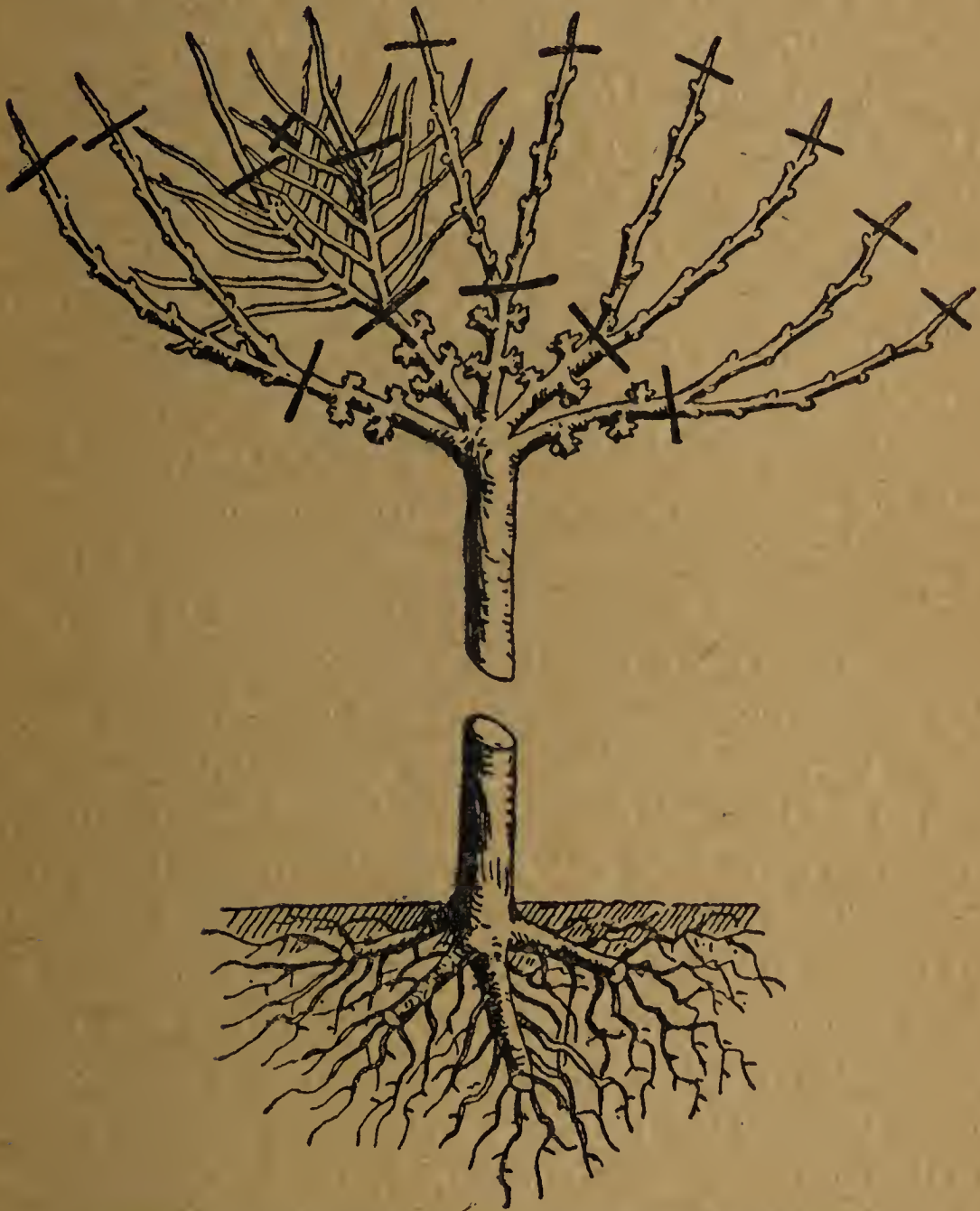


Fig. 29.—GOOD PRACTICE IN PLANTING AND PRUNING.

Shortening the Branches.—Examine the trees closely, root and branch. They were planted in well-prepared ground in the autumn. The long young shoots of the badly rooted tree (p. 58) were not cut back in the spring following, but left their full length.

All the young roots could do was to imbibe and send up just enough sap to enable small leaves to form on the shoots. These neither increased in length nor number, but fruit buds formed on them, including one at the end as is shown on the naked branch on the left (Fig. 28, page 58). They formed on the three other shoots similarly, but are not depicted. The following year they blossomed, and set small fruit towards the end of the branches, and these being weak all of them were dragged down as shown in the examples. The crop exhausted the tree, and it was practically ruined, the roots being totally inadequate to force further growth. The only way of restoring such a tree would be to cut all the five branches boldly back to within six inches of the main stem. But look at the time lost! The whole procedure of letting both the roots and branches alone was a mistake, and the penalty an enfeebled and practically useless tree. It does not matter about fruit weighing down the branches when trees are well-rooted, and making free shoots as well as producing good fruit, but in the case of young trees with few roots and weak shoots, it is a misfortune.

It is pleasant to turn to the well-rooted tree. The five branches (Fig. 29, page 59) were cut back in spring at the lower cross-marks, to less than half their length; the root-force was thus concentrated on fewer buds, with the inevitable result of free growth ensuing. The five branches were multiplied to ten, incipient fruit spurs forming at the base of the originals, and wood and fruit buds as shown on eight of the branches. After this shortening, sufficient branches often form for the framework of a standard tree. If not they may be cut back again the second year, though not so low down as indicated by the cross marks at X page 59, or all the buds below may be forced into growth as represented, and the interior of the tree crowded and incapable of bearing. If only the tips of the shoots were cut off as marked, two or three growths would push from near the ends and blossom buds form on the part below. Thus the number of branches would be increased, and fruit buds induced by the same operation.

Perhaps an enlarged sketch of a branch will enable the matter to be fully comprehended, as it ought to be, for it is assuredly of great practical importance. Fig. 30 represents a branch exactly

as it was cut off an Apple tree when the buds were swelling. The round, scaly buds are blossom and fruit producers, the small buds are growth extenders. The terminal bud, it may be noticed, is a blossom bud, and should be cut off for starting the buds below into growth, if extension is desired ; but if the shoot had been shortened half-way down the year previous, what are blossom buds now would have been forced into shoots, crowding the tree with useless wood, previously referred to as an evil to be avoided. We want, not a thicket of useless growths, but a series of thinly disposed branches studded with fruit buds from the base to near the extremity ; then, with a favourable season, we have the reward of as much fruit as a tree is capable of producing. And what is more, indeed, the gist of the whole question, any cottager can, by following the plain instructions given, produce such a tree.

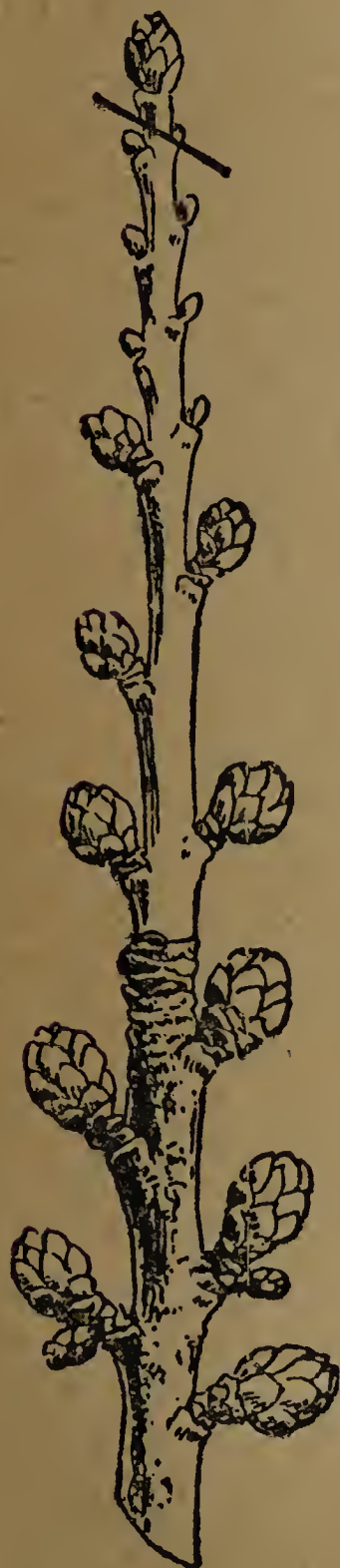


Fig. 30.—APPLE
BRANCH WITH FRUIT
AND WOOD BUDS.

Fig. 31, page 62, will show exactly what to strive for. It is a photographic reproduction of a Cox's Orange Pippin Apple, necessarily greatly reduced, but represented with absolute fidelity. The branches of the tree, as it is growing, are far enough asunder to admit the head and shoulders of a man ; that is the secret of its fruitfulness. The action of the light and air on the leaves

compels fruit spurs to form, as they are shown, all over the tree in question. If the branches had been crowded, thus excluding sun and air, blossom buds could only have set towards the ends of the branches, and the crop of fruit would not have approached half of what the tree now produces, namely, one and a-half hundredweight, worth, at the least, 2d. a pound when ripe.



Fig. 31.—A GOOD APPLE TREE.

The tree is twelve years old from the graft, and nine years from planting, is 12 feet high, and the same in diameter. If an acre of such trees were grown at 24 feet apart, the crop would be worth just £100. This uniformity, however, cannot be relied on, and it will be fair to take off half for contingencies ; and the profit on culture, placing the cost at £12, will be highly satisfactory.

It is to be remembered, however, that the tree is only half-grown and in five years' time will be capable of bearing thrice the above weight of fruit. A tree of the same character, of a variety of the Nonpareil, in Mr. Jacob's garden, at Petworth, this year (1889) afforded eight bushels, which sold at 8s. a bushel. It is twenty years old, and improving every season. But it must be clearly understood that the best of trees, even in the care of the best cultivators, cannot be relied on to bear full crops every year. Sometimes frost destroys the blossom, while a too heavy crop of fruit may so far exhaust a tree that it needs, and will have a year for recuperation. (See "Thinning Fruit," page 88.)

Pruning.—The yearly pruning of trees grown on the common-sense principle represented, is of the simplest. All that is needed is to examine them about midsummer, also in August or September, and cut back any young shoots then which threaten to crowd the tree, leaving four or five leaves at the base of each shoot. Also at the same time the pruner should not hesitate to cut out a main branch here and there that may cross or otherwise press against the others. The great object is to secure the admission of the sun's rays between the branches when in leaf. Note the condition "when in leaf," for on that success hinges to a far greater extent than is generally recognized; even by persons who have been long entrusted with the management of trees. Thinning-out when a tree is crowded, rather than shortening the main branches, is a golden rule in pruning for the production of fruit.

It does no harm whatever to remove useless shoots and branches in summer. In numberless trees many urgently need removal, and at no other time is it possible to judge with such accuracy what portions to take out for the benefit of the tree. No escape of sap follows to weaken the tree, as is erroneously supposed by persons who talk without thinking, or write without experimenting; but the sap is simply turned into other channels, where it will be of far greater service than in the crowded parts

removed. When summer pruning is carefully done, very little winter pruning is needed. A few snags may require to be cut back a little closer, and a branch shortened here and there which may be encroaching on space it is not desired to occupy. That is all. Summer pruning, intelligently carried out on the simple lines indicated, is conducive to fruitfulness, whereas encouraging trees to make a crowd of young shoots in summer to be cut out in winter, is very much akin to working on the treadmill; for there is little or no fruit at the end of the labour, and nothing but shoots keep pushing up, to be cut out again in the tedious, profitless, yearly round.

When dwarf or other Apple trees miss fruiting for a year or two, through frost destroying the blossoms, too much growth is often made. This can only be checked by reducing the roots, severing some of the strong ones, as shortening the branches alone aggravates the evil. If the trees are young, or have only been planted three or four years, and produce gross branches a yard long in a season, it is a most excellent plan to dig them up entirely and replant at once. The work takes up little time, and the whole character will be altered. After the root-pruning a selection should be made of well-placed branches at least a foot, and better 18 inches, apart; if these are left nearly their whole length, only removing the tips, the remainder being cut out entirely, and no others permitted to extend in their place, the tree will be wreathed with blossom the second spring.

VARIETIES OF APPLES.

A good choice is important, because inferior varieties clearly take up as much space, and extract as much nutriment from the land as superior sorts do. It is clear, therefore, that while the former are wasters, the latter may be producers of wealth. At the National Apple Congress of the Royal Horticultural Society

in 1883, upwards of fourteen hundred varieties considered distinct were shown. The experience there gained exploded a popular fallacy, namely, that certain varieties only succeed in certain districts. Facts proved conclusively that many Apples which were best in the south were also best in the north, with trifling exceptions, and everywhere. Of that fact there could be no doubt ; yet where a good local Apple is found of great value, it would be foolish not to increase and grow it.

In choosing varieties for planting, the habits of the trees must be kept distinctly in view, with freedom of bearing and period of use. Some of the most handsome Apples seen at exhibitions are not the most profitable to grow ; and varieties that bear most abundantly on very small trees do not continue profitable for many years, but are soon "worn out," especially in dry districts, and where the soil is not of the best kind for fruit culture.

SELECTIONS OF COOKING APPLES.

COMPACT GROWERS FOR BUSHES ON THE PARADISE STOCK
(EXCEPT WHERE OTHERWISE MENTIONED).

(Planting distance 8 feet apart.)

1. EARLY WHITE TRANSPARENT (*July and August*).—A beautiful Apple, of good size, and refreshing in an uncooked state.

2. POTTS' SEEDLING (*September*).—A large and excellent Lancashire Apple ; the best of all for smoky districts.

3. STIRLING CASTLE (*October*).—Hardy, and a great bearer. Requires good soil, and the fruits often need thinning for attaining a large size. [FREE STOCK—as described page 53.]

4. SEATON HOUSE (*October and November*).—A bountiful bearer, and requires generous soil, also the crop thinning if closely packed on the branches. [FREE STOCK.]

5. GOLDEN SPIRE (*November*).—Close, upright grower, and free bearer of pale yellow conical fruit.

6. BISMARCK (*November to January*).—A sturdy grower and early bearer of large bronze-red fruit.

7. LANE'S PRINCE ALBERT (*January to April*).—In sound

fertile soil, and the crops thinned, the fruits are fine and valuable [FREE STOCK.]

Nos. 2, 3, and 7, make excellent low Standards on "Free" Stocks, and may be planted 15 feet asunder.

MEDIUM GROWERS FOR BUSHES ON THE PARADISE STOCK.

(Planting distance 10 feet apart.)

1. LORD GROSVENOR (*August and September*).—Sturdy and healthy grower, and good bearer of large fruit; one of the best of its season. See page 9.

2. GRENADIER (*September*).—Not so strong as the foregoing, but a great bearer and useful.

3. COX'S POMONA (*October and November*).—A healthy grower, and free bearer of brightly-coloured fruit; good also for eating.

4. ROYAL JUBILEE (*December to February*).—A free healthy grower, and bearer of good marketable fruit.

5. ALFRISTON (*January to March*).—Good grower and free bearer (on Paradise) of fine, firm fruit.

6. NEWTON WONDER (*January to April*).—A hardy Derbyshire variety, introduced by Mr. Pearson, Lowdham, Notts., and one of the best late Apples grown.

All in this list may be grown as Standards, on Free Stocks, planted 25 feet asunder. Nos. 1, 4, and 6 are excellent cookers in their season, and No. 3 is good for eating or cooking.

TALL STANDARDS OR ORCHARD TREES.

(Planting distance 30 feet apart.)

1. KESWICK CODLIN (*August to September*).—A very old-northern Apple, but one of the best of growers and surest of bearers.

2. ECKLINVILLE (*September*).—A healthy growing and free bearing Irish Apple, but the fruit will not keep long after gathering.

3. WARNER'S KING (*October to November*).—A robust grower and good bearer of the largest of fruit.

4. LORD DERBY (*November*).—A good grower and bearer of handsome fruit, but succeeds better in the south than in the north of England. Good also as bush on paradise.

5. BEAUTY OF KENT (*November to February*).—A strong grower and good bearer of handsome well-coloured fruit.

6. BRAMLEY'S SEEDLING (*December to April*).—One of the hardiest and sturdiest of growers, will thrive where many would fail, and a good bearer of valuable fruit. Profitable also as bush trees on the Paradise stock; grown 12 feet asunder.

SELECTION OF EATING (DESSERT) APPLES.

COMPACT TO MEDIUM GROWERS FOR BUSHES ON THE PARADISE STOCK.

(Planting distance 9 feet apart).

1. MR. GLADSTONE (*July*).—The first summer Apple, but soon over. Gather before fully ripe, and dispose of quickly.

2. IRISH PEACH (*August*).—Excellent quality, rather light cropper, bears at the ends of the branches; this should be remembered when pruning.

3. LADY SUDELEY (*August to September*).—Handsome, tender and enjoyable. Bears at the tips.

4. DEVONSHIRE QUARRENDEN (*September*).—An old favourite dark crimson Apple, but rather small. Tree a good bearer.

5. WORCESTER PEARMAN (*September*).—Tree hardy and a good bearer of brilliant medium-sized fruit; flesh tender, and quality fair. Its colour sells the crops.

6. JAMES GRIEVE (*September and October*).—A comparatively new Scottish apple which, as possessing the flavour of Cox's Orange, while being hardier and earlier, is worthy of inclusion in this list.

7. YELLOW INGESTRIE (*October to November*).—Tree a free bearer of small, symmetrical, pretty fruit. A favourite Apple in the streets of London, and there misnamed Golden Knob.

8. KING OF THE PIPPINS (*October to November*).—Hardy, useful, and free bearer; in that respect one of the most reliable; quality good, though not equal to Cox's.

9. ALLINGTON PIPPIN (*November to December*).—Tree a rather stronger grower than No. 10; fruit attractive, and though not equal in quality to that of its prototype, still good and likely to be profitable.

10. COX'S ORANGE PIPPIN (*November to January*).—The Queen of dessert Apples. If one tree only of an eating Apple for Christmas is wanted this may be chosen; growers for market who planted it by the score or hundred a few years ago were wise.

11. SCARLET NONPAREIL (*December to February*).—Good medium grower, and free bearer of rather small bright fruit.

12. COURT-PENDÛ-PLAT (*February to April*).—Tree compact in growth; fruit of good size and quality. This has been called the Wise Apple, as not blossoming till after the time of the usual spring frosts. It is also known as Wollaton Pippin.

STANDARD OR ORCHARD TREES ON "FREE" STOCKS.

Numbers 3, 4, 5, 7, and 10 in the above list; also,

GASCOYNE'S SCARLET (*December to January*).—Very handsome; good for cooking and eating.

FEARN'S PIPPIN, also known as Clifton Nonesuch (*November to December*).—Tree hardy and a great bearer; fruit of fair size and quality, and much sold in markets.

BLLENHEIM PIPPIN, generally known as Blenheim Orange (*December to February*).—An almost certain bearer of fine acceptable fruit when trees attain to maturity—a rather slow process. Dwarf bush trees on the Paradise Stock bear much sooner.

A SHORT DIGEST.

The fourteen hundred Apples grown in this country (ten times too many), are reduced in the above selections to thirty-four. There are more than these worth growing, as will be noted, still numbers of persons only require from one tree to a dozen. They may be assisted in their choice by a short digest.

Among COOKING Apples it may be observed that (1) *Potts' Seedling* excelled all others in a large collection in the suburbs of Sheffield, thus entitling itself to be considered the best for smoky districts; (2) *Stirling Castle* (autumn), and (3) *Lane's Prince Albert* (winter), will, if the trees are supported, and the fruits thinned, if needed, give the most fine Apples off the least space of ground; (4) *Lord Grosvenor* is the best grower of early varieties, and gives fine fruit for use or sale in summer; (5) *Warner's King*, a strong grower, gives the largest fruits for autumn use; (6) *Newton Wonder*, and (7) *Bramley's Seedling*, rank among the best long keeping culinary varieties.

Among EATING Apples (1) *Lady Sudeley* is one of the most esteemed in early autumn; (2) *Worcester Pearmain* is the "selling" Apple of its period (September); (3) *Cox's Orange Pippin*, the best of all for home use or sale; (4) *James Grieve*, an earlier form of No. 3, and worthy of a place in gardens; (5) *Cox's Pomona*,

medium grower (cooking or eating); and (6) *Gascoyne's Scarlet*, strong grower, are good both for cooking and eating. Here we have a "baker's dozen," and all or any of the varieties may be planted to suit individual requirements.

In large private gardens or experimental plantations several more varieties may be grown for home use and educational purposes. There are many good sorts omitted from the above selection, such as (*culinary*): Baldwin, Betty Geeson, Cellini, Dumelow's Seedling, Wellington, Domino, Duchess of Oldenburg, Emperor Alexander, Golden Noble, Grantonian, Hormead Pearmain, Lady Henniker, Lord Suffield, Manks' Codlin, Nelson Codlin, Peasgood's Nonesuch, The Old and New Northern Greening, Queen Caroline, Sandringham, Stone's Apple, Reinette de Canada, Striped Beefing, The Queen, Tower of Glamis, Tyler's Kernel, Winter Hawthornden, Yorkshire Beauty, and others.

Good *dessert* sorts, worthy of being included in extended collections are, in addition to those previously mentioned: American Mother, Adams' Pearmain, Astrachan (Red), Beauty of Bath, Cockle's Pippin, Claygate Pearmain, Dutch Mignonne, Gravenstein, Kerry Pippin, Lord Burghley, Mabbott's Pearmain, Mannington's Pearmain, Margil, Melon Apple, Ribston Pippin, and Sturmer Pippin. All of these possess good qualities, and the list could be extended. Well-grown collections of hardy fruit on the estates of large proprietors would not only add a feature of interest and usefulness to their homes, but be in effect small pomological schools that might be of service to cottagers and small holders in the surrounding districts.

A few comparatively new Apples of promise worth trying are: Armored, Atalanta, Charles Ross, Early Victoria, Langley Pippin, St. Edmund's Pippin, Chelmsford Wonder, Bow Hill Pippin, Lord Hindlip, Paraquet, Early Rivers, Rivers' Early Peach, St. Martin's, Prince Edward, Blue Pearmain, Rival, The Houblon, Wm. Crump, and Winter Quarrenden.

ENEMIES OF APPLES.

These are mainly :—1. The *American blight*, a woolly Aphis which infests the stems and seriously injures the trees. Its presence is indicated by white, fluffy masses. In winter a mixture of 4 ozs. soft soap dissolved in a gallon of hot water, stirring in briskly a wineglassful of petroleum, will, if forced with a brush into every crevice where the insects are lurking, destroy all that are reached. In the summer apply spirit of wine with a soft brush.

2. The *Codlin moth* caterpillar causes “worm-eaten” Apples. Secure fallen fruits promptly before the caterpillars leave them and ascend the trees ; they may be prevented doing so by a band of cotton-wool, hay, or sacking, well smeared with cart grease and oil ; or soft-soap half-a-pound, Stockholm tar and whale oil, three parts of the tar to one of the oil, the whole slightly heated and mixed ; or of resin and oil, two-thirds of the former and one of the latter, melted and mixed ; the bands to be placed round the base of the stem. For spraying see below and pp. 105-6.

3. The *Winter moth*, the caterpillars of which devour the blossoms and leaves, and ruin the crops and trees. It is the most destructive of pests. The wingless female moths crawl up the stems in September for depositing eggs. The smeared bands should therefore be applied in good time, though they are not always effectual. After the leaves fall, the petroleum mixture recommended for the woolly Aphis may be syringed all over the trees. In the spring spray with *Paris Green*. This is an arsenical preparation that is much safer to use in paste than in powder form. It may be used at the strength of half-an-ounce to ten gallons of water just before the blossoms expand ; again, when the petals fall, and subsequently as needed. It is best applied in the form of a *misty spray*, and should rest on the leaves like dew, not run off them like rain. It is also an additional preventive of the “Codlin moth.” Stir the liquid when using, and do not apply it when the trees are in full flower (See also Appendix page 126).

Hellebore powder beaten into paste with hot water, then mixed at the rate of an ounce to a gallon of cold water, is safe and good for the purpose, killing all ordinary caterpillars it reaches without injuring the blossom or trees.

Fowls are of great service in fruit gardens in devouring insects, except at a time when they might also partake somewhat too freely of the smaller kinds of fruits. In plantations of Apples they can do nothing but good.

Lime washing the stems and dusting the branches thickly in winter, as advised for Gooseberries, are good for the trees, root and branch, and obnoxious to their enemies.

PEARS.

Pears are more of a luxury than a necessity, but a most refreshing and wholesome luxury in large demand by a great and important section of the community. They should be grown where they can be grown well, as they may be in deep fertile soils. Pyramidal-shaped bushes on the Quince stock usually produce the finest fruit, because the roots are more fibrous and spread near the surface, where the soil is generally richer than below. Where it is of the best character, to a depth of 2 or 3 feet, trees grow strongly, and bear fine fruit on the Pear stock.

The procedure in respect to planting, trimming the roots, and pruning the branches, is precisely the same as that advised for Apples (pp. 58, 59—63). Except in very warm localities, only late summer and early autumn Pears should be planted as orchard standards.

The following Pears ripen somewhat in succession, from July to the end of the year, and may be grown as bushes, pyramids, or low standards. It may be convenient to the inexperienced to arrange the varieties under their usual periods of use, but this is governed by localities and seasons; also of the later sorts by

storage, warmth accelerating and cold retarding the ripening process :—

SELECTION.

July and August.—(1) Summer Doyenné ; small, free bearer, the first summer Pear ; (2) Citron des Carmes ; small ; gather both as soon as the colour changes, or they will be mealy ; (3) Jargonelle (as a standard).

September.—(4) Williams' Bon Chrétien ; large, musky flavour ; (5) Fertility ; great bearer, hardy, useful market Pear ; (6) Beurré Superfin ; large, compact grower, excellent quality.

October.—(7) Louise Bonne de Jersey ; handsome fruit, richly flavoured ; (8) Marie Louise d'Uccle ; free bearer, hardy, useful ; (9) Fondante d'Automne ; superior flavour ; (10) Comte de Lamy ; small, very free, excellent quality ; good as a standard.

October and November.—(11) Beurré Hardy ; hardy, free, fertile, good ; (12) Pitmaston Duchess ; the largest Pear, strong grower, best on Pear stock, good ; (13) Durondeau ; large, very handsome, juicy and refreshing.

November and December.—(14) Doyenné du Comice ; very large, especially against a wall ; perhaps the sweetest and best of Pears ; (15) Emile d'Heyst ; large, good grower, of excellent quality.

For a limited choice the small July and August Pears may be omitted, and the required number taken in the order of their names from the other three sections.

It may be stated that there are two kinds of pyramid, or bush Pears. 1. Pruned trees restricted to a certain size and shape, suitable for certain positions in gardens. 2. Naturally grown bushes, which are only slightly pruned, and assume much larger dimensions than the others. Both types bear well, but the latter eventually yield the greater weight of fruit, and are much the easier to manage. These are the trees for cottagers and busy working men to produce, and the nearer they approach the specimen, Fig. 32, page 73, the better. It is a splendid tree of Pitmaston Duchess Pear, twelve years old, fifteen feet high, and nearly as much in diameter. Any fruiterer would have given £2 for the crop last year (1888), before it was gathered, and it was as

good the year previous ; this year (1889) it is not. The best of fruit trees cannot be depended upon to bear uniformly every year.

The branches appear crowded, but that is the consequence of the enormous reduction by photography, to represent such a large



Fig. 32.—A GOOD PEAR TREE.

tree in the small space. The branches are 18 inches to 2 feet or more apart, indeed, sufficiently distant for the sun and air to play amongst them, hence the fruiting spurs the whole length of the branches, and the heavy crops of splendid fruit produced. The tree is on the Pear stock, and growing in soil that is good to a

depth of two or three feet. It is standing evidence of the truth of Mr. Shirley Hibberd's aphorism, namely: "IT MUST NEVER BE FORGOTTEN THAT FRUIT IS THE PRODUCT OF CULTIVATED LAND AND CULTIVATED TALENT"—a sentence which should stand out boldly and clearly, and be committed to memory by every person who is engaged, or about to engage, in the occupation of growing fruit, no matter of what kind. The pruning to which this fine Pear is



Fig. 33.—DIAGONAL CORDON PEARS.

subjected is precisely the same as that described on pp. 61—64, in the chapter on Apples. It is the essence of simplicity, and practically and philosophically sound.

Trees for Walls.—The finest of fruit is produced by trees trained to walls or to boarded fences, provided the roots are in good soil. It may be said that there are acres of unoccupied wall

space, such as cottages and other buildings, as well as divisional fences between gardens, that might be utilised in the manner suggested. There is no other way in which walls can be covered so quickly as by planting what are known as *single cordon* trees, or in other words, trees limited to one stem. If these are planted and the leading growth not shortened till it reaches the top of the wall or fence, the side growths being summer and winter pruned, the trees bear abundantly, and the wall is quickly covered. These are the cheapest of all trees to purchase, and the easiest to manage. The illustration (Fig. 33, page 74) from a photograph

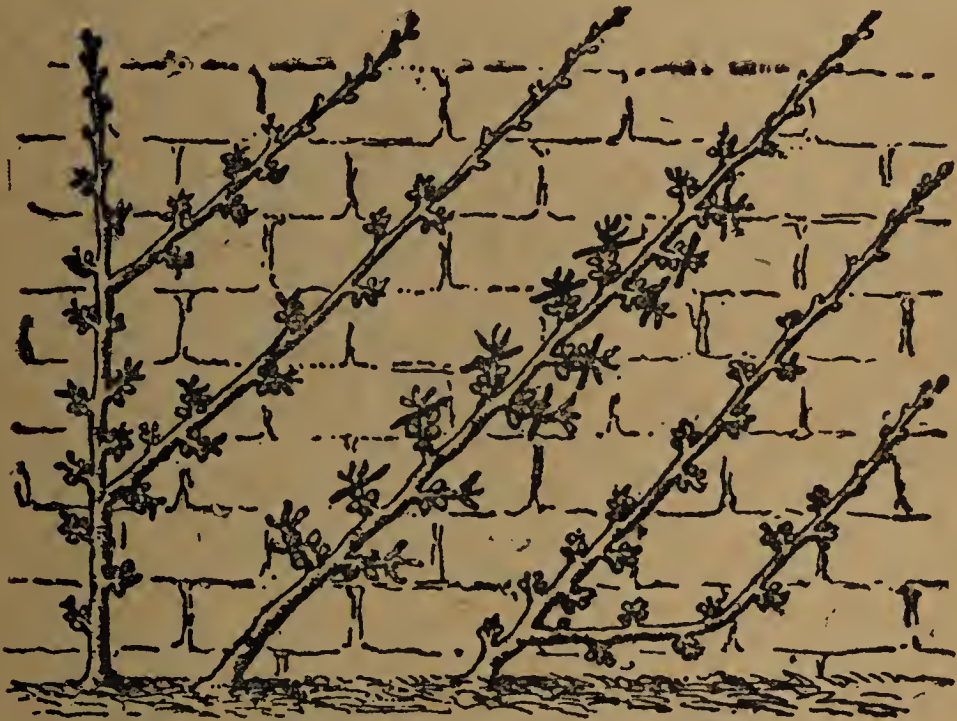


Fig. 34.—CORDON TREES. (PRUNING).

taken by Mr. Cheal, in his Lowfield Nursery, Crawley, will be elucidatory. Apples, Plums, and Cherries can be grown in the same way, either against walls or tall trellises. For the lofty walls of dwellings the trees may be planted 18 inches apart and trained vertically; for lower surfaces, plant three or four inches wider apart and train diagonally, as depressing the stems brings them closer together.

Pruning.—When side growths extend from the trees in summer

nip off the ends at the sixth leaf, and shoots that push again to one leaf as often as produced. In winter cut back the snags to rounder buds at the base, as indicated by the cross-lines in Fig. 34, page 75, and that is all the pruning needed by these easily-managed and productive trees. It is equally applicable to trees with many branches, trained horizontally or otherwise, but these main branches should never be less than a foot apart. It has been said that the leading growth, or top, of a cordon tree should not be shortened till it has extended as far as is desired. There is one small, but important, exception to that dictum. If the end bud of a tree, or any main branch of a tree, that is desired to extend, is a good round blossom-bud as shown in Fig. 30, page 61, it must be cut off to a smaller wood-bud below, or the vacant wall or trellis space may never be covered at all.

Enemies.—Scale insects on the branches, and the slug-worm, the larva of the saw-fly (*Selandria*), on the leaves are the chief enemies of the Pear.

Where scale abounds, the branches have a rusty incrustated appearance. Methyated spirit brushed well into the bark destroys scale; as also does a solution made by dissolving a quarter of a pound of soft soap, and a walnut-sized lump of soda, in a gallon of boiling water, and while hot stirring in a wineglassful of petroleum such as is burned in lamps. In the winter apply with a brush, stirring the mixture as the work proceeds. The slug-worm (a slimy grub that attacks the leaves), is destroyed by dusting with freshly-slaked lime, or syringing with clear lime water, which is made by mixing a pound or two of lime in lumps in a pail of water, stirring well, then allowing it to get clear. If any lime settle at the bottom of the vessel, the lime-water is as strong as it can be made; if there be no settlings it is not so strong as it should be. Slugs cannot endure it, and it is beneficial rather than injurious to all kinds of fruit trees and garden crops.

PLUMS.

Wherever blackthorns, or even common hawthorns, grow freely, Plum trees will thrive ; indeed, they succeed in any fertile soil, and especially that which is rather strong and contains chalk. Plums are essentially useful. In some districts they are more profitable than Apples, and they come into bearing sooner. They cannot be depended on to produce full crops every year, as their early blossoms are occasionally injured or destroyed by frost. This, however, is a contingency to which all fruits are liable, but failures may be reduced to a minimum by the selection of hardy and prolific varieties. Foremost amongst these stands the Victoria, with its large, pink, egg-shaped fruit. It is the Plum of Plums for cottagers and small holders to plant. As an indication of the extent of its cultivation, 200 tons of fruit were sent from a small railway station in North Notts. last year (1888), and sold at an average price of £10 a ton, or an aggregate of £2,000 from one district, as produced by a number of cultivators. The year previous, which was a great Plum year, 400 tons were sent from the same station (Tuxford), and realized an average price of £8 a ton, or a total of £3,200. It is not unusual for a healthy tree to yield a hundred-weight of good fruit, and this at the low price last named, is equal to £77 per acre, with the trees 15 feet asunder, leaving a profit of at least £50.

The late Ven. Archdeacon Lea, of Droitwich, who planted three acres of land with fruit trees in 1865, for experiment, and a similar extent in 1874, with the object of determining the profits derivable from different kinds, found Plums the most satisfactory of trees when the right sorts were planted. His experiments with fifty-one varieties justified his recommending the Victoria, Rivers' Prolific (purple), Pershore (yellow), the Diamond (black), and Pond's Seedling (purplish red) as the most profitable for

cottagers. Add to this list The Czar (purple), Cox's Emperor (red), and Monarch (black), and we have some of the most serviceable Plums in cultivation. Rivers' Prolific and Victoria do not make such large trees as the others, but are the most certain of bearers.

If only one Plum is wanted plant the Victoria ; if two, add Rivers' Prolific (the smallest but earliest) ; if three, the Czar ; if



Fig. 35.—PLUM, PRUNED AND BEARING.

four, Monarch. These will give a succession of fruit for about two months. Pond's Seedling is one of the largest Plums, and often very prolific. Those varieties are extensively used for cooking and preserving. They are also eaten ripe by the multitude who can get them, but for richness in quality, by no means equal such, among others, as Early Transparent Gage, Purple Gage, and Jefferson.

Damsons.—These serviceable autumn fruits must not be overlooked. The very hardy and free-bearing Farleigh (or Cluster), Bradley's King, and Prune, if planted in good soil, require little attention, and good samples meet with a ready sale in the markets. Many large growers do not find any difficulty in disposing of sixty tons a year, and the grass land on which Plums and Damsons are established would let much more readily for £10 an acre than the part without the trees would let for £2.

The remarks on planting and the general management under Apples (pp. 55—63) apply equally to Plums ; and with the sketches here following the cultural routine cannot easily be misunderstood.

Fig. 35, page 78, represents a Victoria Plum tree—one side as it should appear when pruned, the other showing the result, the crop. It will be seen that the pruned side is not a mass of interlacing shoots, but is open, with a sufficient number of small "twiggy" shoots. However, after once or twice shortening the shoots when a tree is young, for obtaining the requisite number of main branches, all that is needed with Plum trees generally is the occasional removal of a branch here and there that may crush against the others, and cutting back a few young shoots to the spurs, or clusters of blossom-buds at the base. But in the case of bearing trees of the Victoria, it is a good plan to shorten strong shoots that are made in summer, as if these attain a great length the brittleness of the wood causes the branches to break with the weight of fruit. That is the only fault of this valuable Plum. It is often necessary to support the branches with forked props, but these may be to a large extent, if not entirely, dispensed with, by keeping the head somewhat compact. This plan of shortening a luxuriant branch here and there, when it extends much beyond the others, is practised by the best Nottinghamshire growers, but is not generally adopted, because not generally known. It is seldom, if ever, needed by other Plums. Victoria Plum trees are best on stems not more than 4 feet high, for con-

venience of pruning and gathering the crops. They are excellent also for walls, fences, and buildings, bearing and ripening well on north aspects in most parts of the country.

It is desirable that beginners in fruit-growing should learn to distinguish between growth-buds and blossom-buds, or they may do more harm than good with the knife. Blossom-buds are round, see the spur, Fig. 36, which was cut from a tree when the buds were swelling. The shoot on the right was cut off the spur, leaving on it one growth-bud, which is apparent; and equally apparent



Fig. 36.—PLUM SPUR.



Fig. 37.
PLUM SHOOT.

is one blossom-bud on the shoot removed (Fig. 37, above). Better specimens of the different buds could not be desired, or a better example of spur-pruning for producing a large

cluster of fruit. The great point to remember, is the importance of preventing the interior of the trees being crowded with shoots, by cutting out those which obstruct the light and air about midsummer. If they are allowed to remain to grow into a thicket, evil is done, and cutting them out in winter is very far from being a satisfactory remedy. The summer is the time for relieving, or rather preventing, overcrowded trees, which never did produce, and never can produce, the fullest crops of the finest fruit.

Enemies.—These are mainly aphides, popularly known as lice ; the red spider, an almost invisible insect that extracts the sap from the leaves, causing a yellowish hue, as if scorched ; and mildew, or fungus, that appears in multitudinous specks. The remedy for aphides is tobacco water, which may be made by using soft boiling water at the rate of one gallon to two ounces of the strongest shag tobacco, and allowing it to stand till cool ; its efficacy is increased by dissolving two ounces of soft soap in each gallon at the time it is poured on the tobacco. If this fail, add a decoction of quassia, made by boiling “chips,” obtainable from chemists, at the rate of two ounces to a gallon of water. Tobacco juice, when required in large quantities, can be purchased more cheaply than it can be made at home. The remedy for the red spider is the soft soap solution, mixing a large handful of flowers of sulphur in three gallons. The remedy for mildew is half an ounce of sulphide of potassium in a gallon of water. The mixtures are best applied with a syringe, at the first moment the “enemies” are seen ; if allowed to become firmly established, they are most difficult to eradicate.

CHERRIES.

Except in the great Cherry districts, where large numbers of trees are established, Cherries are the least serviceable of fruits for cottagers to grow. The reason is this: where there are a thousand times more Cherries than birds can eat, those they take are not missed; but where the trees are comparatively few, and birds relatively numerous, it is most difficult to prevent their devouring the crops, of the sweeter kinds especially. Isolated trees of these must be netted if the fruit is to be preserved, and then the cultivation is not profitable. Where Cherries naturally grow and bear well, and birds do not unduly abound, the crops are lucrative; and all the cultural details for producing them are embodied in the chapters on Apples and Plums. If a few sweet Cherries are particularly desired for home use, it is the best to plant a tree or two against a wall or fence for convenience of netting, the alternative being to grow dwarf trees in the open where they can be protected. Early Rivers, black; Elton, pale yellow; Governor Wood, mottled red; and Black Eagle are excellent varieties. If one only is required, no great mistake will be made in choosing Early Rivers, which bears abundantly fruit of the best quality. Birds, however, do not attack Morello or Brandy Cherries, so long as they can obtain any sweeter; and trees grown as bushes in the open bear heavy crops in the southern and midland counties, and the fruit usually finds a ready sale at a remunerative price to the grower. They are excellent for growing against the north sides of buildings. It is to be understood that cottagers and small farmers are not recommended to engage in the culture of sweet or dessert Cherries as a profitable undertaking, except under the special conditions above mentioned, and with the experience of owners of established trees to guide them. For enemies and remedies see remarks under PLUMS.

OTHER KINDS OF FRUIT.

There are other kinds of hardy fruit besides those above mentioned, but however delicious, they are not of substantial value to cottagers, allotment-holders, and small working farmers, hence descriptions of the cultivation of Peaches, Nectarines, Figs, Vines, and Mulberries would be out of place in an essay of this nature. It may be stated, however, that if one Peach tree should be wanted against a south wall, the Dymond is good ; as a Nectarine, Lord

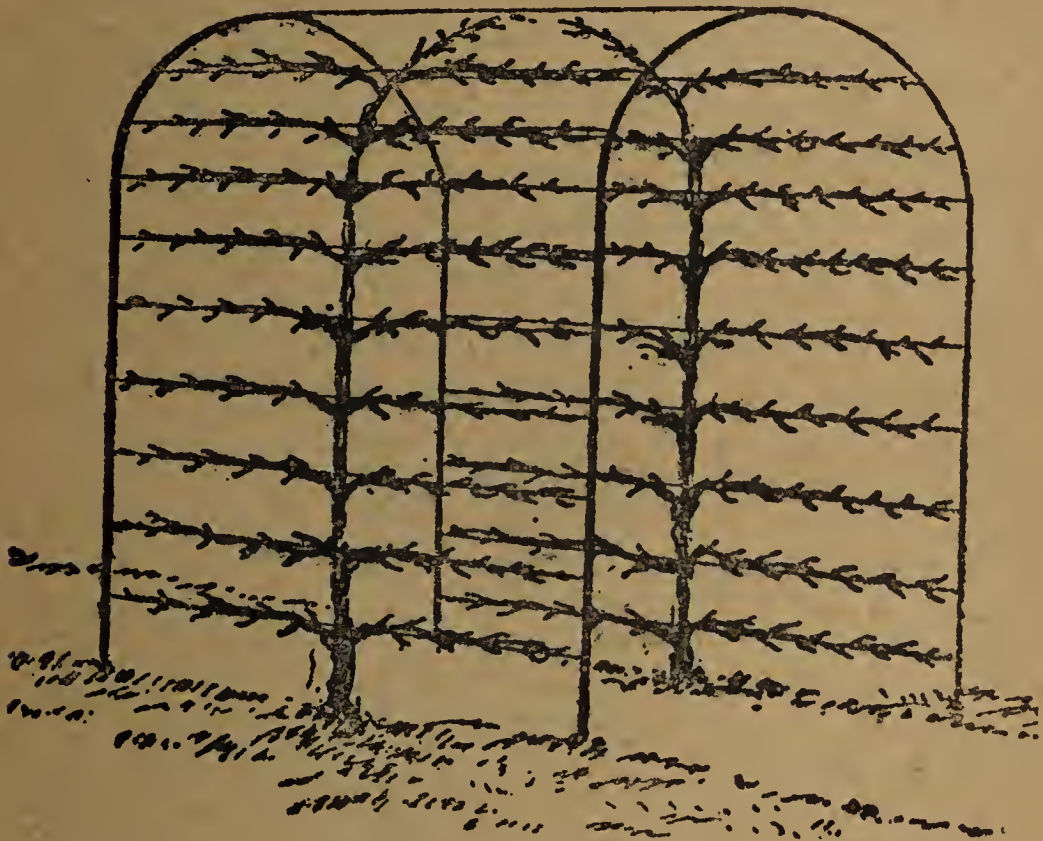


Fig. 38.—A FRUIT ARCH.

Napier ; and as a Grape Vine, Chasselas Vibert. In some localities where Apricots flourish, good bearing trees of the Blenheim and Moorpark are occasionally seen trained against dwellings, and where these trees exist they form examples for imitation to persons who wish to have similar specimens. As to Figs, Brown Turkey grows well in warm sunny chalk pits ; but practically speaking, the kinds of fruits named are beyond the scope of the great industrial body for whom guidance in useful fruit-growing is desired.

The large American Blackberries may be grown if desired, and they cover old walls and fences profitably where the plants grow well. They like rather strong and moist soil, succeeding better in the cool damp north than the dry and sunny south. In planting and pruning, the advice given for growing Raspberries is applicable, cutting out the old growths and leaving the young for bearing being the most important point in management. They afford clusters of large black fruit in September and October, and what is known as the Parsley-leaved Bramble is one of the best sorts to grow. They cover arches over walks, and in this way much excellent fruit may be grown, and space utilised which otherwise could not afford a pennyworth of produce. The Loganberry must not be forgotten, as it thrives in most soils, is easily managed and bears abundantly. It may be trained on wires or arches.

IMPORTANT ITEMS.

Manuring Fruit Trees.—As a rule too much manure is given to trees when young, and not sufficient when old or bearing freely. If stout young wood extends much over a foot in length the soil is rich enough: if less than that assistance is needed. The simple mixture recommended for Gooseberries on page 42, is good for all kinds of fruit, to be applied as there recommended, as far as the roots extend. So is a mixture of one part bonedust, two parts kainit, and two parts of charcoal dust, as recommended in the *Herefordshire Pomona*, to be applied at the rate of a quarter of a pound to the square yard. Genuine guano is excellent; so is nitrate of potash (saltpetre), at the rate of 2 oz. per square yard; and good stable manure spread on the ground in the autumn, and there left to decay, encourages growth in weakly trees. Persons who desire a more scientifically complete manure for fruit trees may adopt the formula of Mr.

Edmund Tonks, for Apples, though it is good for other kinds—superphosphate of lime, twelve parts (or pounds); nitrate of potash, ten; common salt, four; sulphate of magnesia, two; sulphate of iron, one; and sulphate of lime, eight—mix and apply at the rate of a quarter of a pound to the square yard to trees that do not make satisfactory growth. Liquid manure of any kind, applied in summer or winter, is of great benefit to weakly trees.

Grafting Trees.—This is one of the oldest arts in gardening, also one of the simplest and most useful, yet a great number of persons who are interested in fruit-culture are necessarily unacquainted with the process of converting a Crab into an Apple, a Quince into a Pear, or making a tree that bears bad Apples or Pears produce good ones by putting on new heads. The first conditions for success are that the cut-down trees, termed stocks, are fairly healthy; and the portions to be added, which are called grafts, or scions, must be of firm, clean, young wood, not soft succulent shoots.

These grafts or scions should be taken off in winter before the buds start in growth, and be laid in damp soil in a cool, shaded place to keep them back until the sap in the stocks has commenced moving. That is one of the things to be remembered—the growth of the stock to be a little in advance of the scion or graft. Trees, whether large or small, to be grafted should be cut down in spring. When other trees are pushing fresh growths, the still dormant and retarded scions may be attached. A good time for grafting is usually early in April. The illustrations, A, B, C, Fig. 39, page 86, will make one process clear. The shoot A is the graft or scion, with the first slice cut off the end; B (which should be the same length as A), is the same, showing an upper cut in the front, and a small shaving taken off the back to make the end wedge-shaped; C is the branch, or a small tree, shortened, and cut for receiving the scion, which is placed in position for growing. With a sharp knife, thoughtfully guided, the work is easy. This is called whip or tongue grafting, and care must be taken that

the inner bark (cambium layer) on one side, at least, of the stock and scion are brought exactly together.

In dealing with large branches, crown-grafting is the simplest plan to adopt, and it can be made plain in a few words. Given a stock (Fig. 40, page 87), headed down, scions are inserted, many or few according to the size of the stem. They are cut as shown and slipped down between the bark and the wood, slits being made for their in-



Fig. 39.—WHIP OR TONGUE GRAFTING.

sertion, and tied ; then the crown of the stem, also the ligatures, are well covered with wax or clay ; this applies to both forms of grafting.

Grafting-Wax and Clay.—There are different methods of preparing grafting-wax. The following is simple and good. Resin, 8 parts ; tallow, 3 parts ; red ochre, 3 parts ; burgundy pitch, 1 part. First melt in an iron pot the resin, add the tallow, and lastly the red ochre. Stir well together, but do not make, nor use, too hot.

[Also see Supplement, page 101.] The object of grafting-wax is to exclude air, and, if any cracks appear, they must be promptly filled, leaving a smooth surface. In the absence of the above preparations, the object in view may be accomplished with thick plasters of clay or tenacious loam, beaten into a paste, with about half the quantity of dry horse droppings uniformly blended throughout the mass. It must be pressed closely round the stems, as in Fig. 41, and as often as any cracks form they must be plastered up. The



Fig 40.

CROWN GRAFTING LARGE TREES.



Fig. 41.

CLAYING THE GRAFTS.

pigment then answers as well as wax, indeed, some grafters prefer it, and its application is facilitated by coating the hands with dry, finely-sifted ashes.

Thinning Fruit.—Some Apple and other fruit trees are notorious for bearing heavily one year, and remaining practically barren the next. That is because they are so much exhausted in maturing the load of fruit, that they cannot at the same time form and develop blossom-buds ; but if the clusters are well

thinned when the fruit is small, leaving one or two Apples or Pears on a spur, instead of thrice that number, and the same with Plums, the fruit attains a much larger size, the crops are more valuable, and the trees are not unduly weakened. Occasionally complaints are rife about "gluts of fruit," and the "crops not worth gathering," but high-class samples have always met with a ready sale during periods of the greatest abundance, and these



Fig. 42.—A LESSON IN FRUIT (AND BRANCH) THINNING.

REFERENCES.—1. Thinly-disposed Branches and Fruit—health and profit.
2. Overcrowded Fruit—exhaustion by (3) seeds, and loss.

are always to be had by thinning crowded crops on healthy trees, hence the work ought not to be neglected.

It should be remembered that if Grapes were not thinned the crops would be worthless. It is much easier when needed to thin hardy fruits on low trees, and equally profitable. The illustration (Fig. 42) conveys a double lesson. Each of the branches (1) contains

twelve Apples. The branch (2) below is laden with thirty-six. Assuming each Apple contains five pips or seeds there would be 180 on the clustered branch, but only 60 on the thinned branch. These seeds have to be fed, and it has been scientifically proved that an equal weight of small inferior fruit takes much more fertility from the soil than does the large and superior, while the former is practically worthless, the latter distinctly valuable. By easing overladen branches in good time not only do the fruits retained become the finer, but the trees have strength to build up blossom-buds for another year.

The two thinned Apple branches were sketched also for making clear what is meant by the thin disposal of the branches of fruit-trees generally, so strongly advocated in this essay. When the leaves expand under the direct influence of the sun, blossom-buds form along the branches, but not if the branches are overcrowded; while if they are cut closely back the buds left are forced into wood-growth only, with no blossoms for producing fruit.

Gathering Fruit.—It is only necessary to say in respect to small fruit left to ripen, that it should not be over-ripe when gathered for travelling, or it may reach the market in a pulp-like mass, and not realise half the price it would if gathered a day or two sooner; still, the other extreme of sending it obviously unripe must be avoided. Apples and Pears are ready for gathering when the fruit, if lifted up by the hand, separates easily at the connection between the stalk and the spur. If the stalk has to be broken by twisting, the fruit is not ready, and if torn from the trees in that way, it soon shrivels. The pips or kernels are sometimes brown before the fruit is quite ready for gathering. Late varieties have often to remain on the trees till late in the autumn. Easy separation at the natural junction, which no one can fail to observe, is the best guide for the inexperienced cultivator to follow in securing his crops, and he does not then drag the buds for future crops off the trees.

Fruit should be handled more carefully than eggs, for it is

much more liable to injury than they are by rough usage. Throwing tender-fleshed Apples and Pears into baskets, then turning them out carelessly as if they were so many Potatoes for pigs, spoil the samples by bruising. The bruises may not be apparent at the time, but they are there, and will quickly spread to such an extent as to reduce the value of the crop at the least fifty per cent. With a little practice the work can be done about as quickly when done well as when conducted in a thoughtless, slipshod manner. The less fruit is moved about the better, and as far as possible the sorting should be done at the time of gathering, separating the small, specked, and malformed from the large and clean specimens. Thrifty persons offer the best only for sale, keeping the relatively inferior at home, after the manner of our business-like American competitors.

Storing Fruit.—Cottagers and small holders of land shall not be tantalized with instructions for erecting elaborate fruit-rooms and stores. These are luxuries for the affluent, rather than requisites for the working population. It is only necessary to remember that fruit keeps much better in a cool and dark place than in a light and warm one, and if the surrounding air is a trifle damp, it is better than if very dry; but cleanliness and sweetness are indispensable. Fruit absorbs impurities the same as butter does. Two examples will teach a lesson on this point easy to be remembered. A gardener made Mushroom beds in the lower bins of a fruit-room, the upper being filled with Apples and Pears, but the effluvium from the manure employed in the Mushroom beds was absorbed by the fruit, which in consequence was spoiled. A gentleman had a quantity of Apples in a building, into which rats found their way, and for stopping them had tar placed in their runs, with the result that all the fruit was strongly flavoured with tar, and could not be used. Flour barrels are excellent for storing fruit in, but petroleum casks or soap-cases would be ruinous. If unblemished Apples are placed in sweet barrels, and these sufficiently covered with straw, or placed any-

where beyond the reach of frost, the fruit will keep as well as in the most elaborate structures.

Marketing Fruit.—It may appear a strange statement to make, but it is true, that in agricultural districts less care is exercised in sending Apples to market than Potatoes. The latter are sorted, but tons of Apples are offered for sale, specked and clean all mixed together, just as they come from the trees. It is a costly mistake. Every season, both in London and other markets, English Blenheim Pippin Apples cannot be sold for more than a shilling a bushel, while “foreigners” of the same



Fig. 43.—APPLES FOR MARKET, SORTED AND UNSORTED.

variety realize four times the price. There is as much difference between the two—as is represented in Fig. 43, in which sorted and unsorted Apples are shown side by side. Is another sentence needed to enforce the better way? One is required for urging growers not only to sort their fruit, but to let the bulk be uniform throughout. That is the American plan. If a thousand barrels are sold by auction, only one, or at most two, are opened, and according as the brand marks are XX, XXX, so will the bulk be. It is that system of care,

with honesty, that has built up a great trade, and it ought to teach home-growers a great lesson. Do not hide the bad under the good, but, as before advised, let each grower deal with others as he would wish them to deal with him if they were sellers, and he a purchaser of fruit. That is the case in a nut-shell, with the shell cracked and the kernel shown for displaying its soundness, as representing the true principle of marketing fruit.

CONCLUSION (1889).

Endeavour has been made to treat the important subject of this essay as fully as possible within the stipulations—to condense the essentials of fruit culture and fruit management into its pages; to teach soundly, and, above all, plainly, in the hope of teaching usefully those who have or can acquire land for producing fruit for their families, and for the inhabitants of adjacent towns, to the mutual advantage of all. Given knowledge on the subject and industry, many an example proves, and some have been adduced, that—to quote the words of Alderman Sir James Whitehead, Bart., Lord Mayor of London (1889)—“there is no reason why much land should not be made three times, five times, as profitable as it is now, by fruit cultivation; and if the work is carried out with energy and zeal, it will be of great benefit to the country we love so well.”



SUPPLEMENT TO THE SIXTH EDITION.

(1901.)

WHEN the foregoing Essay was written, it was imperative to bring it within the stipulated number of 20,000 words. This involved such rigid compression, that a considerable amount of matter of an important practical character had perforce to be omitted. The necessity for the original limitation having now lapsed, the Court of the Worshipful Company of Fruiterers affords an opportunity for adding to some of the original paragraphs, as well as for appending fresh chapters. These will treat on subjects that have been suggested by enquiries, for while the information in previous editions has met with generous acceptance, hundreds of letters have shown the existence of an unmistakeable demand for more light, fuller guidance, and greater knowledge on Fruit Culture in some of its various aspects. This is entirely satisfactory, and it is a pleasurable duty to endeavour to meet expressed requirements in a manner that it is hoped will widen the usefulness of the work.

COTTAGE FRUIT GARDENS.

When allotments are situated at a distance from a labourer's cottage, it is seldom convenient to attempt Fruit Culture, for obvious reasons; but on many estates it is now fully recognised that it is far more advantageous, either to provide larger gardens, or to have the allotments as near the cottages as possible. On such allotment-gardens, which may vary in extent from a few

square poles to a rood, fruit-growing can easily be combined with vegetable culture, to the material profit of the worker. The object of the industrious holder is to make the utmost of every portion of the ground at his disposal, and when it is wished to introduce fruit trees or bushes it becomes a question how it can be done in the most profitable and economical manner.

Some generous landlords, desiring to assist their cottage tenants, have planted portions of the gardens with suitable hardy fruits, and in several instances where this has been done serious results have followed, by closely cropping with vegetables amongst the trees. The space usually available in such gardens does not admit of such inter-cropping, with a prospect of profit proportionate to the risk. In the majority of cases it is far more satisfactory to allot a definite portion of the garden to the fruit, and the remainder to the vegetables, as both crops can then be managed conveniently and successfully. This has been admirably demonstrated in the Woburn Experimental Fruit Farm, which is maintained by the Duke of Bedford (worthily described as "one of the best landlords in England"), with the assistance of Mr. Spencer Pickering, F.R.S., as Scientific Director, and an experienced manager.

In this establishment, which is partly designed to benefit the tenants on the Bedford Estates of some 70,000 acres, half-acre plots are set out to illustrate the method of planting and arrangement adapted to the different classes of tenants. Amongst them are two plots designed for cottagers, which are especially intended to demonstrate (1st) the culture of fruit apart from the vegetable crops, and (2nd) a combined or intercropping system. Exactly the same numbers of trees and bushes are grown in each plot of the same varieties, and equal areas are allotted to the vegetables, yet the gross returns for produce sold have, since 1894, averaged 20 per cent. higher for the first named system, *i.e.*, with the fruit and vegetables separate.

Where a liberal area of garden is allowed to each cottage, the

arrangement of a space for fruit is usually a simple matter, though it requires a little consideration. The three small plans (Fig. 44) will give an idea how this has been accomplished on some estates. The plots here shown are thirty yards wide by forty yards long, *i.e.*, slightly less than a rood each, and they have a cottage for one family, or what is more frequently the case, each block contains two cottages, while occasionally there may be four, with a proportionately increased garden area.

When, as in the first plan (on the left), the cottage is on the south side and near the boundary, it is usually convenient to

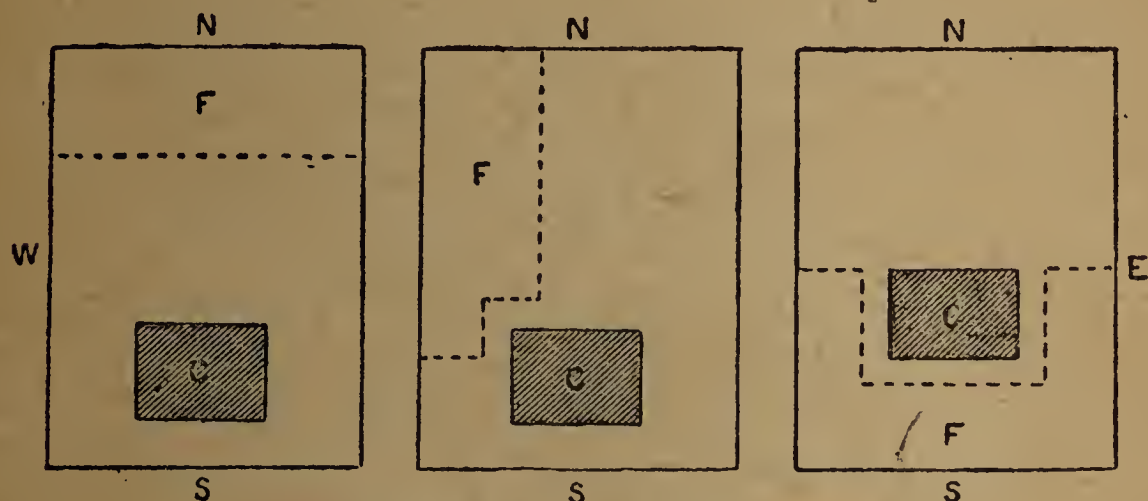


Fig. 44.—COTTAGE FRUIT GARDENS.

(Scale, 1 inch = 30 yards.)

REFERENCES.—C Cottage. F Fruit Garden. N North. S South. W West. E East.

have the fruit department (one-fourth) at the north end, as represented. If for any reason that is objectionable, a strip down the west side can be set off as shown in the centre plan. The cottage is sometimes placed farther back from the road and nearer the centre, as in the plan on the right, then it may frequently be convenient to have the fruit garden in the front and at the sides, if the space be sufficient to prevent overshadowing; provided also that it is not too near a public road, or there is a suitable protection in the shape of a hedge or fence. In either of the above instances a similar arrangement of fruit trees and bushes will be suitable.

In Fig. 45 a method is shown which has proved satisfactory when applied to gardens situated like the first of the three plans on page 95. The area is 30 yards by 10 yards, and the distances are such that, with the varieties recommended and proper treatment, no removals for thinning would be needed for at least ten or twelve years, and probably not for a much longer period, if exception be made of the Gooseberries and Currants.

In the centre are small standard Apples at 18 feet apart, with bush or half-standard Plums between them. On each side of this line is a row of dwarf Apples, at 9 feet apart, and space is then left for four rows of bush fruits, at 6 feet apart in the



Fig. 45.—ARRANGEMENT OF FRUIT TREES AND BUSHES.

(Scale, 1 inch = $8\frac{1}{2}$ yards.)

REFERENCES.—A Dwarf Apples. S Standard Apples. P Bush or Half-Standard Plums.
G Gooseberries. R.C. Red Currants. B.C. Black Currants.

rows, thus providing for 20 Gooseberries, 20 Red Currants, and 20 Black Currants; or the proportion of either can be varied according to requirements.

If it is desired to still further utilise the ground, the intermediate spaces can be planted with rows of Strawberries, at 2 feet apart, for the first three years, when they should be cleared away. At the side where protection is most needed a Damson hedge can be formed, and on the south side a row of Raspberries will prove useful.

The proportion of Plums can be increased if desired, by substituting them for some of the dwarf Apples, or in favourable soils and situations Pears could be introduced in the place of

some of the latter. If fewer standards are required, the end and central trees need only be planted, the three then standing at 27 feet apart, and the intermediate spaces being filled with dwarf Apples, Pears, or Plums.

This general plan can be modified in various ways, according to the extent and form of the garden to be planted, but the minimum distances have been given for a permanent plantation of a mixed character. For more limited areas some of the smaller growing Apples can be planted at 6 or 7 feet apart, but they must then have the whole of the available space.

Well proved varieties for such gardens and arrangements as are here referred to, characterised by moderate growth, hardiness, and free cropping qualities, are the following :—

APPLES AS SMALL STANDARDS.—*For cooking* : Lord Grosvenor (*August to September*), Potts' Seedling (*September to October*), Lane's Prince Albert (*November to April*). *For eating* : Worcester Pearmain (*September*), Cox's Orange Pippin (*November to February*).

APPLES AS SMALL BUSHES (2 of each).—*For cooking* : Potts' Seedling (*August to September*), Stirling Castle (*October to December*), Seaton House (*October to January*), Lane's Prince Albert (*November to April*). *For eating* : Devonshire Quarrenden (*August*), Lady Sudeley (*August to September*), *Cox's Pomona (*October to December*), *Bismarck (*October to January*), Cox's Orange Pippin (*November to February*).

*Large fruits for cooking, small for eating.

BUSH OR HALF-STANDARD PLUMS.—Rivers' Early Prolific (*July*), Czar (*August*), Victoria (*August*), Monarch (*September*).

DWARF PEARS, FERTILE AND COMPACT.—Williams' Bon Chrétien (*September*), Fertility (*September*), Dr. Jules Guyot (*September to October*), Belle Julie (*October to November*), Emile d'Heyst (*October to December*), Doyenné du Comice (*November to January*).

GOOSEBERRIES.—Early Sulphur (for early gathering, ripe) ; Keepsake (for early gathering, green) ; Whitesmith (for early gathering, green, or fine ripe) ; Whinham's Industry (very useful, green or ripe) ; Lancashire Lad and Crown Bob (good colour and quality, green or ripe).

RED CURRANTS.—Raby Castle, Red Dutch.

BLACK CURRANTS.—Baldwin's, Boskoop Giant.

RASPBERRIES.—Superlative, Carter's Prolific, Norwich Wonder.

The plans and appropriate selections have been obligingly supplied by Mr. R. L. Castle. For specimen trees see page 9.

IMPROVING OLD FRUIT TREES.

Though it must never be forgotten that the finest and most valuable of fruit, such as is seen at exhibitions, and assigned prominent positions in the windows of fruiterers, can only be afforded by trees that have not lost their vigour by age, or been enfeebled by neglect, it should also be remembered that many existing trees, at present of little value in gardens and orchards, are amenable to improvement.

It is not always wise, under the impulse of a great scheme of reform, to proceed too strenuously, such as in uprooting the whole of the present trees that bear indifferent fruit, and proceeding to make plantations of modern varieties. When existing trees bear useful fruits for home consumption, though of small value in markets, as surplus stocks have proved, it is far better to plant young trees on a fresh well-prepared site than to uproot the old and plant others on the same site; some at least of the old trees can be made to bear better fruit, and may even be given a "new lease of life" pending the time the new come into bearing. That is a safe plan, and the best in the case of innumerable British homesteads. Discrimination, however, must be exercised in the choice of trees for improvement. There are some, even thousands, that are beyond renovation—gnarled, decayed, effete centenarians, and attempts at improvements would be wasted on them.

SHY-BEARING TREES—RINGING.

There are large Apple and Pear trees that grow luxuriantly but bear sparsely. If the few fruits they do bear are good, more may be induced by a very old process seldom resorted to now-a-days, known as "ringing." It has been practised with great success by a grower of fruit for sale at Ipswich, Mr. Robert Garrod. His practice is, about the first week in June, to remove

down to the wood a ring of bark not more than a quarter of an inch in width, from towards the base of those luxuriant branches of his trees that fail to form fruit-buds. This checks the upward rush of sap in spring, but is more particularly effective in arresting the downward current of elaborated matter, and blossom-buds often form abundantly. Excessive vigour can also be subdued by "root pruning," which will be subsequently referred to, but it is not easily carried out by amateurs on very old trees. Anyone can try the "ringing" of a few over-luxuriant fruitless branches of Apples or Pears. The practice is, however, not suitable for Stone Fruits.



Fig. 46.—CANKERED HEAD (A) OF APPLE TREE SEVERED FROM B (Fig. 47, page 100).

INFERIOR VARIETIES—GRAFTING.

Some old trees in gardens and orchards differ from the foregoing, inasmuch as while fairly healthy in growth and leafage, they often bear abundance of fruit that is of little more value than crabs. Not only can such trees be changed into producers of valuable fruit, but canker-eaten and enfeebled, if not very aged, trees can be invigorated by cutting them back and establishing different varieties on them.

An example of success by grafting may be cited from Ireland. Rev. J. S. Smith came into possession of an orchard of 140

Apple trees, at Oaklands, Roscommon, in 1894. They were about eighty years of age, canker-eaten and moss-laden. The season's crop only realized £4 10s. from three acres of land. In April of the following year 130 of these useless trees were cut back and grafted with that splendidly constitutioned Apple, Bramley's Seedling. In December, 1898, fruits were sent to the present writer from one of these trees. There were no transatlantic Apples in the London market to equal them. The tree bore sixteen pecks, some of the fruits weighing twenty-two ounces, and its crop three



Fig. 47.—BUDDING SUMMER GROWTHS, FOLLOWING DECAPITATION.

REFERENCES.—B, Stem. a, Slicing off bud from selected variety. b, Removing the pith from wood. c, Bark slit, bud inserted and tied. (See page 103).

years from the grafting was worth at the least 15s. Instead of £4 10s. from the orchard, £100 a year was confidently expected. In some seasons (as crops vary according to the weather), the yield can scarcely fail to be of considerably greater value.

Mr. Smith found by his own experience and observation that the variety named succeeded in Irish gardens, while many others failed, and therefore wisely inserted 1,700 scions (grafts) of it, besides planting 100 young trees. He acted with the more

confidence on finding that the fruits could be kept sound until the spring, when American Apples are over and prices good, whereas he had noted Irish orchards glutted with fruit in the autumn, and prices low accordingly. It will be perceived that common-sense was the guide in this case, and, as the old Quaker shrewdly said, that is the best kind of sense, after all.

Renovation by grafting (and budding) may be made clear with advantage. It is customary to saw the main branches off a tree (making undercuts to prevent splitting) and insert scions into the stumps so formed, about a foot above the fork or main bole of the tree. The plan answers very well, especially if the stumps are from knots. When grafts are plentiful, the branches of a tree are sometimes only half-shortened or less, and 100 scions or more inserted in the necessary smaller ends provided. If all growth is prevented from the stems below the grafts a new bearing-head is quickly provided. The plan, though good, if well carried out, is not generally recommended.

In case of badly cankered trees, although not of many others, the simplest and best method is to behead the tree below all the branches, and insert the grafts in the main bole in March or April. An alternative plan is to allow a selected number of growths to extend from the cut-back bole, and either insert buds of the desired variety in them in August, or attach grafts the following spring. All the methods are shown in the figures. Grafts attached to the young wood are not liable to be blown out.

After cutting the head of the tree the wound must be covered with grafting wax. A simple kind used by Mr. Henry Merryweather, of Southwell, Notts. (the introducer of Bramley's Seedling Apple, and the renovator of many old trees) is made by weighing out and melting together the following ingredients:—Four parts (ounces or pounds) of resin, two of beeswax, and one of tallow. This is run into tins, and re-heated as required for application. It melts at a low temperature, and can be applied with

an ordinary black-lead brush. It is used also for surrounding and excluding air from the grafts (not buds) when the good old plan of "claying" (see page 87) is not resorted to.

By bole or trunk grafting, as will be seen by Fig 40, on the page just quoted, several grafts are inserted in the crown of the bole. They are disposed $1\frac{1}{2}$ inch apart, for quickly forming a "callus plate" over the wound. If the subsequent growths are too numerous, forming a thicket of branches, some of them are cut out the second year. Those retained are made safe against



Fig. 48.—WEDGE AND SPLICE GRAFTING.

EXPLANATION.—Instead of summer budding the growths in B (page 100), they are left to strengthen, and grafted as in C the following spring. Two attached grafts are shown ready for tying above. One graft is clayed and completed. (For details see page 85).

breakage by securing them to stout sticks tied round the stem, and rising 2 feet above it. This is a small, but very important matter, sometimes overlooked by amateur grafters.

The reason why grafting alone improves enfeebled trees is that the increased branch growth of the attached varieties has its counterpart in extended root growth (for roots are underground branches), and the greater the extension within the soil, the greater the amount of food abstracted, and the stronger the

growth above ground must of necessity be. In rich soils it may be too strong. Trees are usually enfeebled through the food which the weakly roots are able to gather being insufficient. Therefore choose naturally strong growing sorts for grafting on such trees. Lord Grosvenor (summer), Warner's King (autumn), and Bramley's Seedling (winter and spring) are suitable, because they have bold leafage which incites root extension, and they produce fine fruit in their respective seasons.

BUDDING.

The chief points to attend to in budding (p. 100) are these :— (1) Wait till the trees are in full growth, the buds well formed, and the sap active. This is usually towards the end of July and in August ; (2) take out the buds cleanly and insert them quickly, before there is any drying of the sap on the bud or the stock ; (3) slice off the bud after removing the leaf-blade with a keen-edged knife, and slip out the adhering wood ; (4) make a slit in the stock through the bark, the length of the bud sliced ($1\frac{1}{4}$ to $1\frac{1}{2}$ inch) with a cross cut at the top, raise and liberate the bark from the wood, slide in the bud, fold the slit bark over it, and bind with soft worsted firmly, leave this worsted for three weeks, when it may be eased or removed.

The amateur, by making a few experiments in taking buds from and inserting them in any kind of summer shoots, may soon become deft at the work. If it is neatly and quickly done when the bark parts freely from the wood (not otherwise) success will be certain. The bud, after the wood is removed from behind it, is usually held in the mouth to prevent drying preparatory to its insertion, the whole process only occupying a second or two. The budded shoot or stem is not shortened till the spring, when the bud, which till then is best dormant, will start into growth, and must (this is imperative) be secured against breakage by the wind.

Should the buds inserted in summer not grow in the spring, the stems can then be cut back and grafted as shown in Fig. 48.

PRUNING, CLEANSING, AND NOURISHING OLD TREES.

Much good has been done in improving the health and consequently the yield of fruit of old trees by the above processes. The trees to be now particularly referred to make very little summer growth—only an inch or two—with small leaves at the extremities of the branches or fruit-bearing parts, but are choked with useless wood in the interior, the stems and branches encrusted with moss and other parasitical growths.

It is not, as a rule, advisable to remove large limbs from such old trees by amputation. Much safer and better is it to clear out all interior growths that do not develop their leaves in the full light, or where they are not shaded by other leaves above them. It should be understood that by clearing out the thousands of leaves from the interior of the tree its resources are concentrated on those on its exterior—i.e., at the extremity of the branches, and just as these are improved in size, health and substance, so will be the fruit.

The first process of the improver must be to saw or cut off close to the main branches all growths, large or small, that do not hold their leaves clear of all others to the full and direct sunlight. Every saw-cut must be made smooth with a sharp knife or chisel. The sooner this is done after the leaves fall the better.

An important supplementary process is often, if not generally, overlooked by pruners of trees. From around the “cuts” close to the main branches, the sap pressure is apt to cause a number of young growths to push. If these, when an inch or two long, are not rubbed out of their sockets in May or June, they will grow rapidly and the tree soon becomes more choked with growth than before. The effect of the pruning is thus nullified, and these robber growths take the sap from the bearing parts.

CLEANSING.

This is an important winter process. An old useful and simple method is, after scraping off moss and rough bark, to limewash the trunk and main stems. This is best done by starting at the

top, as high as can be reached by an active climber, with few or no nails in his boots to tear the bark, and working downwards. Then follow on the first still misty morning, when every twig is almost in a dripping state, with a ladder tall enough to reach above the trees, and a basket of newly-slaked lime from fresh lumps, and dash this into the spurs and buds upwards and downwards in all directions. Much of this will adhere and cleanse the branches, the rest falls to the ground and benefits the roots. Those who think the method antiquated (though there is no doubt about its efficacy) can have recourse to the modern and excellent practice of spraying the stems and branches with a caustic alkali solution. A solution of 1 lb. of ordinary caustic soda alone in 10 gallons of water will cleanse the trees; but the most approved preparation is, after dissolving that quantity of soda in a gallon or two of

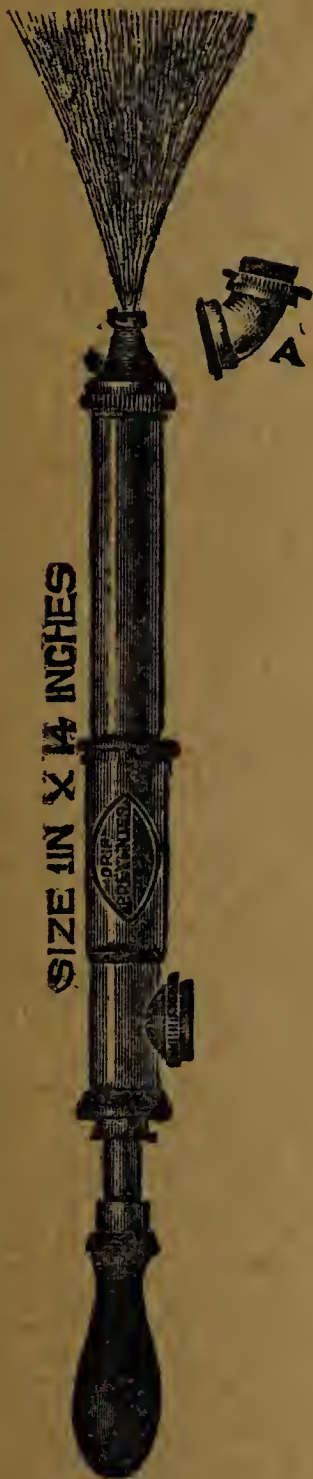


Fig. 49.
WHITE'S "ABOL"
SYRINGE AND
SPRAYER.



Fig. 50.

water, to add $\frac{3}{4}$ lb. of pearlash, then pour into the mixture $\frac{3}{4}$ lb. of soft soap dissolved in a little boiling water. Stir the whole well and dilute to 10 gallons for use. This will not only remove all encrustations, but destroy the eggs of most kinds of insects. It was formerly thought it must be used hot, but it is now found effectual in a cold state.

It must be applied in winter only in the form of a mist-like spray. For tall trees the "Knapsack Pump" with a long nozzle elevator is suitable. The cost is 50s. to 60s. For low trees and general use in small and large gardens the "Abol" Syringe (Fig. 49, page 105) is one of the best introductions of recent years. It can be used to force either a strong jet of water or a spray more finely divided than shown, according to the nozzle employed; and the undersides of leaves near the ground can be reached by unscrewing the straight nozzle and attaching the head as in Fig. 50, page 105. It costs no more than an ordinary syringe.

There are various other appliances for spraying fruit trees, large and small, particulars of which can be obtained from dealers in horticultural sundries.

Caution is needed in spraying with caustic solutions, as they are injurious to the skin and clothes of the operator. Any scarecrow sort of hat or other garment is good enough to use in extensive work with the Knapsack Sprayer, and the hands should be gloved, while the day must be still to prevent the spray being blown into the face. By the methods advised fruit trees can be thoroughly cleansed during the winter, and by destroying their eggs the hatching of insects is prevented and spring and summer depredations are avoided.

NOURISHING OLD TREES.

When an animal is securely chained to a stake in a pasture it can only obtain food within the prescribed radius. With this consumed, and no further supply given, the poor creature would

sicken and die. It is much the same, though by no means entirely so, with a tree. This obtains a certain amount of food from the air as in the form of rain, which with the decay of fallen leaves and surrounding herbage suffice to keep it alive for a number of years. All the same, after the tree no longer possesses the vigour to extend its roots beyond a given radius, the essentials for health are abstracted from its feeding ground, and it ekes out from year to year a lingering and useless life. The lost virtues of the soil can be restored by the cultivator, and this has often been done very profitably.

In thousands of instances the first great essential is water. The subsoil is as dry as a desert. In such cases give what manure we may without water it will have little or no effect. Where subsoils are moist enough (and some are so wet as to need drainage), the case would be different. We will take the dry sites. These need water, and ten times more than many persons imagine—water with something in it—this means liquid manure, which is to the trees rich and nourishing wine.

Nothing will so quickly and certainly restore enfeebled fruit trees as the drainage from manure heaps, the contents of sewage tanks or any kind of good liquid that can be made by dissolving animal, poultry, or pigeon manure, soot, guano or chemical manure, and applying it copiously, so that it may pass right down to the roots at least two feet deep from the surface.

In using this restorative it is well to remember that the best feeding roots of a tree are not close round the bole, but from there outwards, to, and beyond, the spread of the branches. The writer was the first to use extensively and make known the value of liquid manure to old trees in the winter. Applied when the ground is neither saturated nor frozen, the liquid will not only pass down much better than in summer, but its virtues are held and retained by the tight grip of the naturally damp soil. This filters the liquid, and only clear water passes away.

The same results will not follow if the rich liquid be given when the soil is not moist as in summer, for dry soil particles have no such food-holding power. It was also found that the stronger the liquid was given in the winter, the more beneficial was its effect, and numbers of trees doomed to destruction were made to grow healthfully (after pruning and cleansing as above described), and bear profitably for several years.

For inducing the liquid to pass down deeply a number of holes about eighteen inches deep and the same distance asunder, were made with a crowbar, twisting it to widen the diameter. These receptacles were repeatedly flooded and afterwards filled with fresh soil containing a free admixture of wood (not coal) ashes, and a dredging of lime and bonemeal as the heap was turned over. The compost was rammed down and eventually became permeated with a net-work of fibrous roots, to the great advantage of the trees and their owner. Similar practice, when well carried out, has proved effectual in hundreds of subsequent instances.

When for any reason, liquid manure cannot be applied in winter for re-invigorating enfeebled trees, it may be used in the summer, but in such case, and if the ground is dry, first flood it with clear water (making holes if necessary for its reception), to swell the soil. The benefit which the trees derive from the liquid will then be greatly enhanced. Ten gallons of water to the square yard to trees that are struggling against fate in parchingly dry soil is not a drop too much, and half or more of that quantity of liquid manure may follow; mere dribblets of water, or liquid manure, just moistening the soil an inch or two deep, are useless for the purpose in question. The liquid food must pass right down to the roots to act beneficially, the quantity being determined by the state of the soil.

KINDS OF LIQUID MANURE.

MANURE HEAP DRAINAGE.—There is no better than this, which is often allowed to pass uselessly away. It is the very “spirit” of the bulk from which it has escaped. Save it, and apply to exhausted fruit trees, and the darker it is when used in winter the more good it will do. For summer use it may need a little dilution.

STABLE AND HOUSEHOLD SEWAGE.—This, including urine, is excellent, and may be used in winter as taken from the tanks. For summer use, if very strong, it may need dilution.

GUANO WATER.—Best Peruvian guano, such as Chinchas, dissolved at the rate of two pounds in twenty gallons of water, acts beneficially on old trees.

CHEMICAL MANURE.—Three pounds of superphosphate, two pounds of kainit, and one pound of nitrate of soda in twenty gallons of water give valuable support.

NATURAL MANURES.—A peck of poultry, pigeon, or any animal manure in twenty gallons of water may be used freely with advantage to trees that make but little growth.

TOP DRESSINGS.

Liberal dressings of good farmyard manure spread on the surface as far as the roots of trees extend, and allowed to decay, improve the soil and enfeebled trees. A quarter of a pound or more of basic slag and half the quantity of kainit, applied in the autumn to each square yard of surface, followed by $1\frac{1}{2}$ ounce of nitrate of soda in March, would restore to the soil important food elements abstracted by the trees. Top dressings can be used when the soil is too wet for liquid manure, but when this can be made to pass down to the roots it is the quickest tonic for starved trees.

BRANCH AND ROOT PRUNING.

“Why do my young bush Apple, Pear, and other trees make so much growth, but yield so little fruit? The ground was trenched and manured for them, and they have been well pruned. What can be done to make them bear?”

That is typical of hundreds of questions, and there are thousands of such trees in various parts of the Kingdom. They have really been treated in the best manner to prevent fruit. The too rich soil has forced too vigorous growth. The long strong shoots above ground have compelled the extension of long strong roots within it. The shoots have been reduced by “cutting them well back,” but the roots have been left in all their strength and force. This accumulation of root power could have no other effect than producing more and stronger branch growths yearly, until the trees became mere thickets. Fruit-bearing under such conditions is impossible.

The true course of procedure in such cases, where trees are said to be “all wood and no fruit,” is to remove entirely a number of the long, strong, crowded young branches, not merely shortening them, but taking them clean out and allowing no others to grow in their places. Those that are retained should be as uniform in strength as possible, and equidistantly placed, for giving symmetry and balance to the tree. These, what may be termed permanent branches for fruit-bearing, ought not to be less than fifteen inches apart, and may well be more distant. The leaves of one branch will then develop quite clear from those on neighbouring branches, exactly as shown in the illustration on Thinning (Fig. 42, page 88).

These main summer branches ought not to be cut back in winter, beyond removing the soft tips of some of those that are

evidently not ripened, but practically left their full length. If much shortened, they will push a number of strong growths and choke the tree, as shown at x in Fig. 29 (page 59); if left intact or nearly so, they will grow blossom-buds, as indicated in the same figure, and the following year bear fruit in the manner represented on page 88, and they will do this with the more certainty if several of the strong roots are shortened for reducing the sap pressure on the buds. If the position the trees occupy, such as near paths, does not permit of the desired branch extension, but shortening is imperative, it is equally imperative that the roots be shortened still more, or thorough root-pruning practised.

It may be repeated, for emphasis, that young fruit trees which grow over-luxuriantly two or three years after planting, may often, with great advantage, be lifted and replanted at the end of October, as no tree can be dug up without leaving more than half its food-gathering roots behind; a natural check is given by such replanting, which arrests growth and induces fruitfulness.

Larger gross-growing trees that produce little or no blossom, should have a deep trench dug round them, about one-third the distance from the stem that the trees are in height, chopping off all the strong roots with a sharp spade, retaining the fibrous portions; and particularly the tree should be undermined for severing strong, vertical roots. Pare the roughly-chopped ends of the roots smoothly with a sharp knife; fill in the soil, adding a dredging of lime and gritty matter, such as wood ashes; place the mixture round them with the hands, add more soil in which to spread the fibrous roots, then make all firm or almost hard. Do this at the end of October, and the whole character of the rooting system will be altered.

The effect will be seen in blossom-laden trees the second season, if the branches are also treated as above advised. If the growth of a tree is too strong, yet not excessively robust, a half-circle of the roots may be pruned one year, and the circle completed the next. Judgment must be exercised. The question of pruning is a ques-

tion of brains that comprehend the principles on which action should be based. What are those principles? Briefly these:—

1. We prune to shape the trees and lay a foundation for future bearing ; and hence when trees are young and branches few, we cut them back for producing more. Shortening increases the number.

2. We prune to maintain an equilibrium of parts by diverting the sap from the stronger to the weaker, and effecting a balance of strength between roots and branches.

3. We prune to induce a fruitful habit by the formation of fruit-buds. This can never be done by encouraging a crowd of strong growths in summer, and cutting them closely back in winter.

4. For strengthening growth we prune or shorten weakly branches early and closely in the autumn. For weakening growth we attack the roots in the autumn, or prune the branches slightly late in spring.

5. The end buds on the upper side of shortened branches usually push stronger shoots than end buds do on the under side.

6. If a tree is desired to be more open in its branches shorten to an end bud that points outwards ; if it is too spreading cut to an end bud that points inwards.

7. Root-pruning arrests exuberance and incites productiveness ; applied to weakly trees, it induces stubborn, stunted growth.

8. Summer pruning (pp. 39 and 63) where needed (as in crowded trees) improves the character of both wood and fruit, because—

9. During the green or growing process of fruits they are usually converting gummy matter into acids. During the ripening period they convert acids and starch into sugar, favoured by warmth, and the full and direct exposure of the leaves to sun and air. Overcrowding means ruin, and this is mainly brought about by random, reckless, senseless pruning. This important subject, it is hoped, will soon be better understood.

FRUIT GROWING IN IRELAND.

Throughout the country, especially as regards the eastern and central counties, in the majority of the best private gardens and nurseries, hardy fruits are well and satisfactorily grown. This is the case, too, in several instances where, from the exposed position or heavy rainfall, success would scarcely be expected. It is observable also, where commercial plantations and orchards in the immediate neighbourhood, all under similar general conditions, have from neglect or unskilful management long ceased to be profitable, simply encumbering the land in a useless manner like some of our west-country orchards. This proves that wherever the soil is of a suitable character, and the situation is not water-logged or unduly exposed, the chief requisites in the production of good fruits in Ireland, as in Britain, are cultural knowledge and constant attention. In every case of failure examined the cause was directly and clearly traceable to inefficiency or want of care; this, too, occurs where farming and general cultivation of other crops are skilfully conducted, as in the northern counties, and there again we find another similarity to the prevailing state of affairs in some English counties.

Early in the nineteenth century systematic attempts at fruit-tree planting seem to have been made in Armagh, Antrim, and adjoining counties, but, with a few exceptions, long periods of neglect have left little but the ruinous remains of what might still have been healthy and productive orchards. The humidity of the atmosphere undoubtedly encourages the increase of such bark infestations as lichens and mosses, but winter spraying or dressing with simple and inexpensive washes could readily correct this evil in a general way, just as it has been accomplished in special cases under the best management.

One point is quite evident, especially along the eastern coast north of Dublin, and that is, the efficient maturation of growth and buds sufficient for continuous fruit production can be relied upon in all ordinary seasons. Apples and Pears develop freely, and in good situations, the former are by no means deficient in colour, or the latter in flavour, as is frequently supposed amongst English growers. Plums and Cherries are not adapted for so many districts, but Gooseberries, Currants, Raspberries, and Strawberries succeed in all fairly good soils where the situation is not too elevated. The last named thrive well in some of the south-eastern counties, and their culture has assumed some commercial importance.

One of the most interesting districts, where general fruit culture has been attempted on the market garden system, is between Drogheda and Gormanstown, as quite a colony of fruit-growers gradually formed there a few years ago, and produced good results. In the neighbourhood of Dublin and several other large towns, there are signs that fruit culture is extending on a proper basis, though there is ample room for much further advance and considerable improvement in methods. (See page 100.)

Cottagers and cultivators of small holdings especially require encouragement and instruction. The establishment of small experimental stations, or gardens for demonstration purposes, the institution of courses of practical lectures, and the dissemination of simple information, such as it is the purpose of this Essay to convey, cannot fail, with the aid of landowners and local authorities, to substantially increase the resources of the Sister Isle in this important department of land cultivation.

Much good work has been done under the Irish Department of Agriculture, and it is satisfactory to know that the Government is alive to the needs of the people.

SUPPLY AND DEMAND.

FUTURE ACTION.

All persons who have been intimately associated with hardy fruit—its culture and disposal—for half a century, are cognisant of the fact that there have been alternations of bountiful crops and inadequate supplies, or, in other words, seasons of plenty and seasons of scarcity. These are popularly known as “bad” fruit years or “good” fruit years, according to the prevailing conditions. These extrêmes are bound to recur periodically, as they are governed mainly by the state of the weather. Sharp frosts or protracted rains during the blossoming period prevent the setting of fruit. Dull, wet summers and autumns prevent the maturation of the wood and the formation of blossom-buds. Moreover, many old, half-starved trees (see pp. 88-89) may be so exhausted by an excess of fruit as to need a year or two for recuperation before they are able to produce more.

During “great fruit years,” when trees are heavily laden with too bountiful crops, markets and shops become crowded to repletion with the produce of orchards. Prices for the great bulk of the supplies are then bound not only to rule very low, but large quantities of fruit cannot be sold at even a small profit to numbers of growers. It is better to admit these facts than to ignore them, and endeavour to do the best that can be done under the circumstances.

The grand lesson still to be learned by thousands of persons who happen to have either surplus fruit for sale, or who have entered on fruit culture with a commercial object, is that the purchaser is the real valuer of the produce, and buys what he considers is best worth the money at which it can be obtained. This is the universal rule in all business transactions. When the markets are heavily stocked with anything, there must be some

decline in price for even first-grade articles. It should never be forgotten, however, that "seconds" and "thirds" fall in decidedly lower proportion, while obviously inferior goods can scarcely be disposed of at any price. It would be very remarkable if this universal law did not apply to fruit. It does so apply, for it is inexorable.

It may then be asked in despair by those who are overwhelmed with low-class grades, "How are we to live?" The answer must be, "Very uncomfortably for the time, for there is no chance to flourish while such worthless overstocks exist." The rejoinder to this may be, and is, in fact, often heard, "Then it is useless to go on planting trees to increase the already too great supply of fruit." This may be described as the shakiest of shaky logic. It could only be sound if the young trees were to yield inferior fruit in turn, and that is contrary to their nature, if the varieties are wisely selected and receive intelligent cultural treatment. It follows, therefore, that so far from an increase of newly-planted trees aggravating the troubles of unsaleable "stuff," it is really the best method of insuring sales at better rates, which really good stocks invariably realize.

There is no lack of evidence of the truth of that statement. It is every year afforded by those home growers who not only raise the finest of fruit from young or vigorous trees, thinning the crops when needed, but who rigidly exclude every inferior sample from the bulks, large or small, that are offered for sale. Such really high-grade consignments always sell freely, even in "glut" years, and no others can be half so remunerative.

Then there is the significant lesson afforded by transatlantic consignments; these, however large, find a ready sale, because of their high uniform excellence in appearance. Only such produce is sent that the great bulk of consumers like to buy. This our over-sea competitors have carefully studied, while thousands of British Apple-growers have given no attention to the matter, but simply expected that whatever they might have to sell people

would take at a remunerative price. Such antiquated notions die hard, but die they must, and the sooner they become extinct the better it will be for both producers and consumers of British fruit.

The very fact that importations of Apples are so extensive is the best of all evidence that the home supply is inadequate for the requirements of the nation; yet Apples and other hardy fruits can be grown as well in the United Kingdom as anywhere else on the face of the earth. But though that is so, millions of bushels of comparatively worthless fruit are produced by our orchards—a

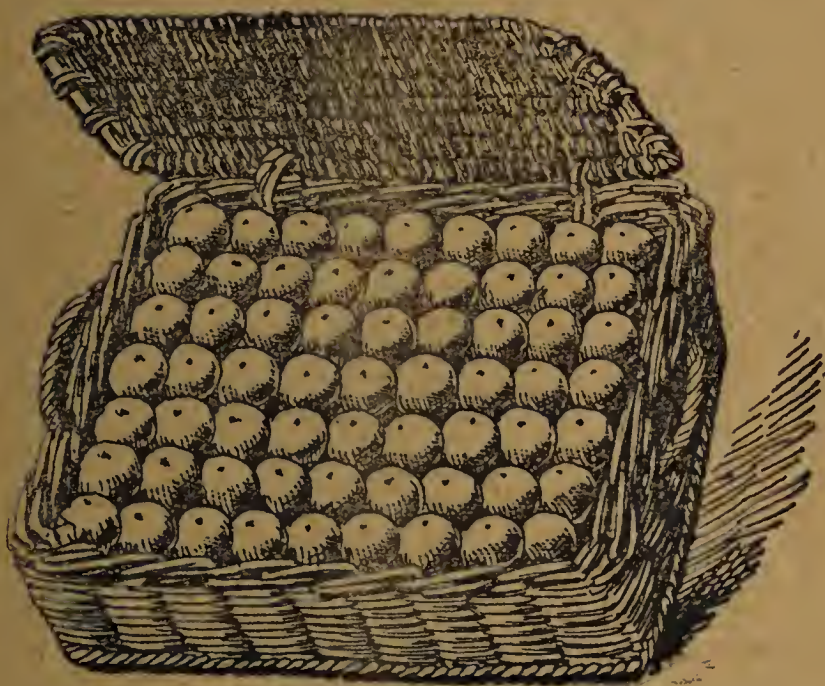


Fig. 51.—A "FLAT" OF APPLES.

bulk equal to that of the superior fruit imported from over the sea. Where rests the fault? Surely not with our successful competitors!

The fruit of the future must not only be grown well, but be sorted carefully, and packed securely and temptingly. Purchasers judge by the eye, not by the palate. They look at the worst in a hamper or other receptacle, and value accordingly, not by the best.

Let, therefore, the fruits in each package be uniform in size,

and, as far as possible, speckless, bright and firm. Two or three crushed Plums, for instance, will spoil a bushel.

Large specimen fruits, if tastefully presented, and sold by the dozen in shallow boxes (Figs. 52 and 53) will more than pay for

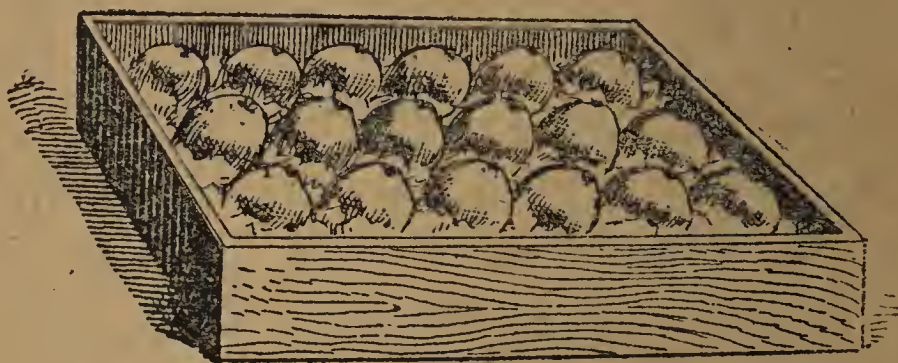


Fig. 52.—PACKING CHOICE PEARS.

the trouble involved. Plums and choice Apples are often sold in “flats” (Fig. 51). They are stoutly made, 21 in. long, 16 in. wide, and 10 in. deep inside measure, to hold a bushel.

Grocers prefer ordinary cooking Apples in rather tall and narrow barrels (see “Storing,” page 90), because they take up much

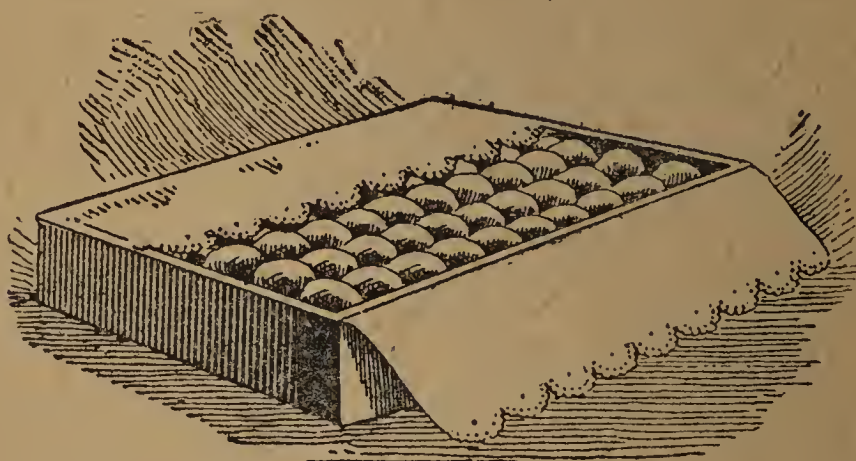


Fig. 53. — BOX OF PLUMS.

less room in shops than do square hampers, while these catch ladies' dresses, and cause annoyance.

If British Apples were equally good, carefully sorted, and packed similarly to the “foreigners,” they would be “stocked” just as freely by traders, who will not look at them in rough,

inconvenient hampers. In these days of all-the-world competition, small points of the nature indicated cannot be ignored, if Britons are to hold their own in the supply of wholesome fruit.

Various questions suggest a chapter in which the Science and Practice of Fruit Culture may be indicated in a popular way, and such chapter may, perhaps, not inappropriately close this Supplement.

EXACT KNOWLEDGE.

Undoubtedly one of the greatest wants of the times is a recognition of the fact that all successful practice in Fruit Cultivation rests on a firm, sound, scientific basis. It is true the mention of the word "science" causes many an honest worker to shudder. It suggests to him something of a complex, shadowy, useless character. Let him cast aside all such visionary impressions, and believe once for all that the word "science" stands for exact knowledge on any subject or work in which he may be engaged. It is not enough to think he knows, as it is so easy to think wrongly ; but he must be able to show and prove, by the execution of his work in the most direct manner, and without any false step or stroke, that his knowledge is really sound, exact, and positive.

Take an example or two. A plan is laid down for, and measurements taken for, making a watch or a coat. The work goes on step by step to completion, and if, when completed, all is perfect and true, we have proof that the knowledge was exact and the plan and procedure scientific ; if the result is faulty, there has been an error somewhere, or departure from the true course, and the failure is the penalty for the misjudgment.

So in planting, pruning, training, and building up a tree for the purpose it is intended to serve, it is necessary to know—not merely to think we know, but actually and positively know—the lines on which to proceed. Then, if no mistake has been made in the plan of action as to site, soil, variety, or working, and no accident happen (from weather or otherwise), the object in view will certainly be attained. This will be proof that the knowledge and procedure were exact, scientific, and therefore profitable. So there is something useful in science or exact knowledge after all; it guides along right lines that lead to the goal of success.

What are those lines in Fruit Culture? The question is a natural one, but premature. It will be better first to ask and understand such questions as these: What a fruit tree is? What it is composed of? Where its materials have come from, and how they have been put together? Let it then be clearly understood that a fruit tree is a living object, just as much alive as we are. It must have suitable food, must breathe, sleep, awake, and do its life's work the same as we must do ours. Trees rest in winter, awaken to active work in spring, continue it through the summer, till they finish their work in perfecting fruit or seed, and prepare in the autumn for another crop in the succeeding year. It must never be forgotten that we can help or hinder them in this work—help them by sound cultural methods, hinder them by mistakes or neglect.

What is a living tree made of? Its bulk is composed of water and charcoal, with very small quantities of metallic or mineral substances, such as potash, phosphoric acid, soda, lime, magnesia, iron, and others. How and whence are they obtained? The water is taken from the soil by the roots and all the minerals are dissolved in it by the acids of the air and the earth, the same as solid sugar is dissolved in tea. Trees thus drink mineral water. The roots take up nothing solid, not a particle of soil, or grain of sand, but the liquid minerals become solidified in their systems. The charcoal is not obtained by the roots from the soil, but by the leaves from

the air, breathed-in as gas—a combination of oxygen and carbonic acid. But the wonderful breathing-leaves separate the two gases, expelling the pure oxygen, but holding fast the carbon, which when solidified is known as charcoal. This they must have, while we must equally have the pure life-giving oxygen which they prepare for us, or there would soon be a dead world.

But the leaves of our fruit trees do more. They are the greatest chemists in the world. They change all that has been gathered from the soil by the roots, and conveyed through the branches and veins, together with the carbon they have taken from the air—they change all into starch, sugar, acids, and other compounds that give to fruits their own particular character, quality, and flavour,* or, in other words, the leaves manufacture the crude and originally tasteless materials into delicious wholesome food, in the form of Apples, Pears, Plums, and other fruits that are grown in our orchards and gardens.

Nor is that all which is accomplished by the leaves of our fruit trees. They form all the buds on the stems, small leaf-buds and larger flower-buds, and in every one of the former mould and wrap up a tiny plant or tree, for these buds can be made to form separate trees. Millions of them do so every year, for most young fruit trees supplied by nurserymen are grown from buds taken from older trees.

Yet one more vital function in plant life and perpetuation is effected by leaves. They themselves change in some mysterious and altogether marvellous way into flowers or blossoms. It may not be known by all who read these lines, but it is all the same true, that all the flowers we see and admire on plants and trees, of whatever kind, are brought into existence by modifications of

* This is proved by the fact that, if several varieties of Apples are established on the same stock by grafting, such as large varieties and small, sour or sweet, yellow or red, they all retain their distinctive characteristics, though supported by the one set of roots, which gather and supply the same food materials to all, the leaves developing the different compounds required by each for the determination of size, colour, or flavour, however different these may be in the respective varieties.

leaves. That is a very striking fact, and seems almost like a resurrection to a new and more beautiful life.

It will be conceded that this concise narration of scientific facts is extremely interesting, but if the matter had not an important practical bearing it would not have been presented here. The first cultural point to be remembered is this: the leaves of fruit trees and bushes cannot do what has been stated unless they themselves are perfect in structure, substance, and the rich deep green of health.

Next, it must be clearly understood that they cannot possibly be in that happy state unless the roots gather and supply them with the necessary materials, dissolved in the soil water, to work with, any more than malt can be made without barley or bread without flour.

Another point to particularly remember is this: if the soil does actually contain the exact necessary ingredients for the best of fruit-food, the leaves cannot use them unless they develop under the direct influence of sunlight. The sun, and sun alone, gives the energy by which all the wondrous work is done. They can no more work effectually, if denied the vitalising sun power, than a steam engine can work in the absence of fuel.

Now the leaves of our fruit trees and bushes can have the precious sunlight by rational intelligent pruning; and light can be, and is, denied them by mistaken methods. To be good, the leaves must not only have adequate support from the roots and be kept clean, but must unfold on those parts of branches that hold them clear of each other to the sun in summer. Then will the materials gathered from the earth and the air be chemically changed, and stored in the wood for the nourishment of embryonic buds, which may develop into growths for the extension of the tree, or into blossoms furnished with protective and essential organs for producing fruit.

This is what science or exact knowledge teaches; it is all in reality beautifully simple when understood, and the clearer the

conception a person has of the concrete facts thus briefly outlined, the less likely will he be to err in the methods resorted to in the cultivation of fruit.

Practically, the whole matter resolves itself into this: we must have healthy roots actively working in sufficiently fertile, yet rather firm, but porous soil, together with perfect leafage, for turning the food so gathered to the best account.

If the soil is too rich and too loose, the natural result is displayed in the form of gross sappy growth, and few blossoms. This is seen in many young trees, as well as in some old trees, that send their roots deep down into wet subsoil, and take up water with little or no mineral food dissolved in it.

If, on the other hand, the soil is too poor, dry, and exhausted by trees that have drained it of its virtues, we have no right to expect other than stunted growth, cankered or mossy branches, small leaves, puny blossoms, and scrubby fruit.

With the soil and roots right and the branches not crowded, the growth will be sturdy and firm; the leaves stout and rich in colour, not flabby, thin, and pale; the blossoms bold and stout; then will the fruit be as fine as the varieties and weather admit, under the care of the intelligent grower.

Fruit Culture, it will be perceived, is an intellectual occupation, and just in the proportion in which the true principles are comprehended on which action is based, will the pursuit be pleasurable and profitable. The secret of success rests in "exact knowledge," and its application in the form of diligent, well-timed, and well-judged work.

APPENDIX TO THE TENTH EDITION.

BY WALTER P. WRIGHT.

IN re-reading, after the lapse of many years, the once-familiar pages of this work, I am struck mainly by two things: the repeated demands for improved packing, and the insistence on certain principles of planting and pruning. The emphasis which is laid on these matters on page after page is proof of how largely they loomed in the mind of the Essayist.

Fruit Packing.—It is satisfactory to be able to record that great progress has been made in fruit-packing since the first edition of the work appeared. Moreover, the lessened use of “sieves” foreshadowed by the Author has come to pass, but with boxes rather than barrels as the standard substitute. Well-packed and well-graded Apples in the standard box of the National Fruit Growers’ Federation, namely, 20in. long, 11in. wide, and 10in. deep, are now the rule rather than the exception. British Apples packed in boxes were building up a large export trade at the time of the outbreak of the War, and, although the development was checked by that immeasurable catastrophe, it is certain to revive in the near future. This fact is of great significance considered in connection with my father’s frequent references to the systematic treatment of the fruit which American and Colonial growers sent to this country. The Mother Country has learned, under this stimulus, from the daughter communities. The fruit-growing industry now engages the attention of organisations of experts, who are giving it the skilled guidance which was almost entirely lacking when the Essay was first written. Hundreds of thousands of acres of fruit trees, chiefly Apples, have been planted in Great Britain during the past twenty-five years, and the produce is handled with care and forethought. We have even seen a great refrigerating establishment come into existence, and, as this is within a mile of my Kentish home, and I have had special opportunities of keeping it under observation, I am tempted to say a word about it. By this system, approved market varieties of Apples are kept fresh, pending favourable states of the market, so that a remunerative level of prices may be maintained. The “J. E. Hall” (Dartford) system consists of a compressor, a condenser, and an evaporator, with two coils of carbonic anhydride. Silicate cotton takes the place of brine. The

air, cooling under compression outside the store, becomes warm again under expansion within the store, thus extracting heat from the atmosphere and lowering the temperature. This, in brief, is the principle, and for many years it has formed the base of the system of refrigeration in the meat-carrying trade with Australia and the Argentine Republic.

With the extension of refrigeration, there will be less to fear from gluts, but gluts never had the terrors for the high-class grower which was commonly supposed. He knew from experience that, taking one year with another, he could do well with his best stuff.

Planting.—In the light of experiments at Ridgmont, much that the Essayist says about the importance of wide and comparatively shallow holes and spreading and trimming of roots appears to be discounted. Yet its value remains. The narrow-deep-hole-trampling-in-with-broken-roots system is merely a reversion to old practice. Many trees grow under it, but in stiff soil many fail. Under the system of planting, root-dressing, and staking (for standard trees) advocated in the Essay, failures are unknown.

Pruning.—Perhaps time has vindicated nothing in the Essay more forcibly than the advice on pruning. In the main it stands secure from criticism. Yet it must be confessed that the Author has not carried the important fruit-growing County of Kent with him in respect to the heading-back of fruit trees in the season of planting. Most of the growers in that great county, and practically all who operate on the strong soils of the Weald, like to give young trees a season of growth before shortening them. But shorten they do, sooner or later, and to a man they are with the Essayist in his advocacy of the hard pruning of young trees, and the maintenance of an open head subsequently. With wise pruning during the early stages of the tree, there is little necessity for elaborate pruning in after years. Indeed, careful readers will see that the Author expressly warns beginners of the futility of heading trees back year after year, lest thickets of soft wood should spring into being and retard fruiting. His advice might be crystallised into the following: (1) Shorten the young tree twice, or even thrice, to get a framework of branches for supporting the fruiting spurs or shoots; (2) If it grows away very strongly, lift it and replant it to check the over-vigorous root-action while it is still young; (3) Always keep the head thin. There are few successful growers who will not fully agree with the advice. In connection with the question

of pruning young fruit trees back in the season of planting, I would ask those who disagree with the Essayist, and prefer to let the trees have a season's growth before shortening them, to try the experiment of waiting till the freshly-planted trees have got well into growth in late spring before heading them. My observation and experience teach me that the results are excellent, because the sap has softened the lower buds and put them; if I may so express myself, into a responsive state, which certainly does not distinguish them at an earlier stage, when the upper buds are still dormant, or only just breaking.

Bees and Fruit.—Since the last edition of the Essay was published, much attention has been given to the importance of associating varieties of fruit, and particularly Apples, the pollen of which helps each other. Generally speaking, it is considered that there should be one row of the complementary variety to four of the stock variety, because then the whole five become thoroughly fertilised. As examples of happy associations, I may mention the following: Victoria with Grenadier; Worcester Pearmain with Cox's Orange Pippin; Worcester Pearmain with Charles Ross; Bramley's Seedling with Newton Wonder. Every Apple mentioned is a valuable one in itself, and each variety is improved by the companionship of the other. In this matter it is, of course, important to associate varieties the flowering season of which is the same, and which are also liberal producers of pollen. With a suitable association of varieties, bees will do the rest. In addition to those named, the following are good pollen-producers: Baumann's Red Winter Reinette, Ecklinville, James Grieve, and Lord Derby. Such high-class Apples as Bismarck, Cox's Orange Pippin, Golden Spire, Grenadier, Royal Jubilee, Lane's Prince Albert, Warner's King, Worcester Pearmain, Beauty of Bath, Allington Pippin, and Cox's Pomona are unsuitable for planting in quantity without associates which can help them in fertilisation.

Grubs and Caterpillars.—Arsenate paste has almost entirely displaced Paris Green as a poisonous wash, and is the accepted remedy for the caterpillar of the Winter Moth, in the proportion of 2lb. per 50 gallons of water. But many growers adopt the Ridgmont plan of adding a fungicide. Thus, 3lb. arsenate paste and 15lb. Woburn Bordeaux paste to 100 gallons of water, used in spring, have the double effect of checking the Winter Moth Caterpillar and of destroying fungi, including Black Scab of Apples.

Lime-Sulphur Wash.—As a fungicide, however, lime-sulphur enjoys particular favour. Since the last edition of the Essay appeared, it is no exaggeration to say that lime-sulphur has made more impression on fruit-growers as a cleanser than any other compound. It can be used on most varieties while the tree is in leaf, but experience shows that conditions of climate have an influence, and consequently it is desirable for the grower to feel his way by experiment. It is generally found that Cox's Orange Pippin is impatient of lime-sulphur at the strength suitable for most varieties. The following formula will provide the experimenter with a mixture which is usually both safe and efficacious: Take 1cwt. lime and 50lb. sulphur; boil $1\frac{1}{2}$ hours in 100 gallons of water, adding water as required to make up for the loss consequent on boiling. An application may be made at the time of the appearance of Winter Moth Caterpillar at the following strength: $2\frac{1}{2}$ gallons with 4lb. arsenate paste to 100 gallons of water. If fungoid disease appears later, the solution may be made without the arsenate of lead, but with the same quantity of lime-sulphur solution.

Lime-Salt Spray.—During recent years, a lime-salt spray has found favour with Kentish fruit-growers. It is made as follows: Take four bushels of fresh white lump lime, slack with a little water, strain, and add to 100 gallons of water; stir in 30lb. of salt and a lump of Russian tallow. Spray on between mid-March and early April till the tree is well whitened from top to bottom. About 300 gallons will probably be required per acre. Alternatively, use a lime wash without the salt, adding 84lb. of good white lump lime to 50 gallons of water, and letting it boil with its own heat.

Burgundy Mixture for Gooseberry Mildew.—The fact that American Gooseberry Mildew is not mentioned in the ninth edition shows how fast things have moved. This pest has created a most serious problem for fruit-growers during recent years. Dr. Horne, an expert of the Royal Horticultural Society, has found Burgundy Mixture efficacious, at the following strength: $40\frac{1}{2}$ oz. sulphate of copper, $45\frac{1}{2}$ oz. washing soda, 100oz. soft soap, 100 gallons of water. The chemicals were dissolved separately, the solutions mixed when cold, and the soap then added. The spraying was done after gentle rain late in the afternoon of the third week in May. A deposit is left on the berries, and this should be washed off before they are used.

Prevention of Big Bud in Black Currants.—The appearance of this pest is only too familiar to most growers.

Before the buds break in spring—sometimes, indeed, before Christmas—they become swollen, and stand on the stems like yellowish-brown globules. The bush makes little growth, fruits sparsely, and soon dies. If the bushes are grown in substantial soil, containing plenty of moisture, thus encouraging abundance of annual growth from the base (and this can be stimulated in case of necessity by liberal applications of manure), the annual removal of the older wood, and the picking-off of any affected shoots, will generally serve to keep the bushes profitable; in light, hungry ground the struggle will be severe. The cutting-back method advised under Black Currants should be tried, and the bushes may be sprayed weekly from the time growth starts till the end of May with the following mixture: Steep 4oz. quassia chips in a gallon of cold water for several hours, boil and simmer for twenty minutes; dissolve 2oz. of soft soap in a gallon of water in a separate vessel, heating the water if necessary; add to the quassia liquor while warm. Alternatively, the bushes may be dusted through a pair of Malbec or Vermorel bellows with a mixture of one part lime in powder and two parts flowers of sulphur; first at the end of March, again at the middle of April, and once again at the end of May.

A Hint about Budding.—The home propagation of fruit trees by means of budding on to selected stocks, such as the Broad-leaved English Paradise for Apples, is perfectly feasible. The process of budding is interesting, and the work of raising one's own trees fascinating. But a great many Apple buds put on to Paradise stocks, and Pear buds put on to Quince stocks, fail because the knack of removing the woody matter or pith from the back of the bud is not properly learned. It is easy to pull out the pith, but it is also easy to pull out the growth germ with it. A green knot, about the size of a Cabbage seed, should be left behind. It is frequently my duty to teach the art of budding, and I find that beginners rarely fail if they are taught to hold the bud by the middle, press the thumb nail firmly on the pith just above the bud, and then twist out the pith in two operations, the first removing the upper part under the nail, and the second the lower part. If the whole of the pith is removed with one quick movement by beginners, the bud is generally dragged out with it. But in connection with budding, it cannot be too strongly emphasised that success turns in a large measure on doing it before the pith has got thoroughly hard. After rain towards the end of July is ideal in most districts.

A Hint about Grafting.—In connection with what is said in the Essay about hares and rabbits barking the trees, it may be interesting to say that if the grower is caught napping, he may retrieve the situation by linking up the bark above and the bark below the injury with a few grafts. Trees barked completely round are liable to die, if nothing is done, because the flow of sap from the roots to the leaves is stopped, but if grafts are attached, new channels are opened up, and the tree soon recovers.

Silver-Leaf.—Within the last ten years fruit trees, particularly Plums and Cherries, have suffered terribly from a disease known as silver-leaf, which gives the foliage a white glaze, and speedily kills the tree. The disease is almost, but not entirely, confined to stone fruits, and of these the Plum suffers most. No remedy has yet been discovered, and if a tree is observed to become badly affected, it should be removed and burned forthwith. Tools used for pruning a tree under suspicion should not be used on healthy trees without being disinfected. Pip fruits should be planted in the place of trees removed, not stone fruits. Trees to be grafted should not be headed back several weeks beforehand and left with raw stumps in the old way, but should be left till grafting time arrives, and then grafted, and waxed as quickly as possible.

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